

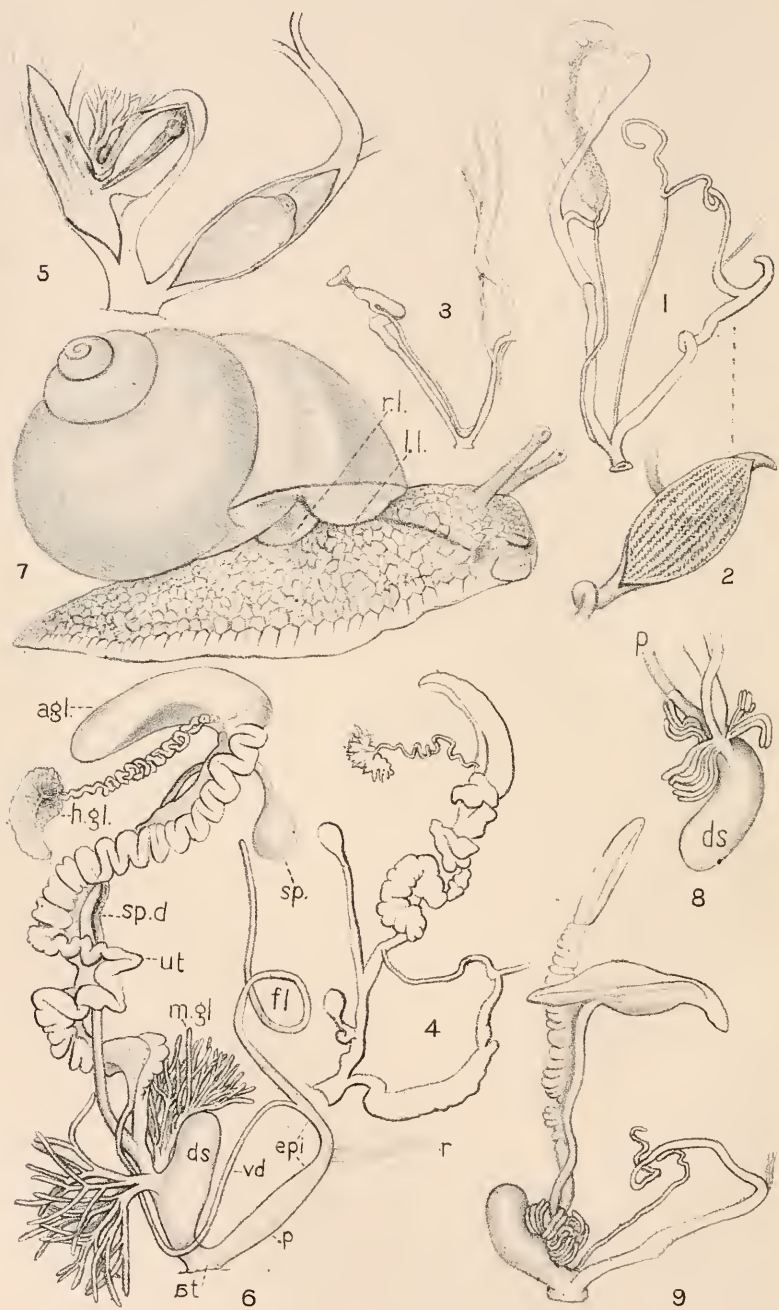
MBL/WHOI



0 0301 0016314 3



FRONTISPIECE



577.
— 7 78
SECOND SERIES: PULMONATA.

MANUAL
OF
CONCHOLOGY;

STRUCTURAL AND SYSTEMATIC.

WITH ILLUSTRATIONS OF THE SPECIES.

BY GEORGE W. TRYON, JR.

CONTINUATION BY

HENRY A. PILSBRY,

CONSERVATOR OF THE CONCHOLOGICAL SECTION AND PROFESSOR OF MALACOLOGY
IN THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

VOL. IX.

(HELICIDÆ, VOL. 7.)

GUIDE TO THE STUDY OF HELICES.

PHILADELPHIA :

Published by Conchological Section
ACADEMY OF NATURAL SCIENCES,
OF PHILADELPHIA.

1894.





PREFACE.

The group of Pulmonate genera familiarly known as *Helices*, forms an important factor in the land mollusk fauna of every country, in point of numbers exceeding any other group of snails. This numerical and faunal pre-ëminence has caused the authors of the *MANUAL* to devote eight volumes to Helicoid genera, the earlier three (Vol. II to IV) being prepared by Mr. Tryon, the later volumes by the writer.

During the progress of the work it became obvious that the established system of grouping required revision, not alone in the details of many minor divisions, but in those broader principles underlying our conceptions of the entire classification and genealogy of the group. The object of this volume is to formulate in compact form the new classification of *Helices*, and incidentally to indicate some general principles upon which a new grouping of all land pulmonates must be based.

In the systematic portion of the work (pp. 1-344) I have attempted to show the main characters of the genera, both in hard and soft anatomy, giving illustrations as copious as the limits of the work would permit; for while fully persuaded that, as Darwin has said, naturalists "never read each other's works," I am sure that they look at the pictures illustrating them. In the Introduction the larger groups are defined (p. xxxii) and their probable genealogy suggested (p. xxxi). Finally, the geographic distribution of *Helices* is discussed with reference to the genesis and migrations of the principal groups, and the origin of modern faunas (p. xxxviii).

Few will dispute the general proposition that until the systematic classification of a group is placed upon a secure basis, all discussion of the larger questions of geographic and geologic distribution is futile. A sound systematic zoology is at once the key and the test of zoögeographic speculations; and without this check, zoologist and geologist are alike at the mercy of mere opinion and speculation, too often based upon false notions of affinity, or upon a decep-

tive external likeness which may mask fundamental differences. These considerations justify, I believe, the stress placed upon mere system in this volume. The treatment of minor groups may be objected to as unduly minute; and it is true that most groups seem over-divided. As my predecessors are responsible for most of this, I have been satisfied to reflect their labors faithfully. Those groups having important structural characters I have considered *generic*; grouping under these as subgenera and sections the various smaller assemblages, which specialists find useful, but which are usually of little systematic value, and not much utility to the general malacologist. These remarks imply no disrespect to the founders of this multitude of groups. Their labors were necessary in pointing out the differential features of Helices. They sought differences, for the establishment of new groups; the modern systematist seeks more profound likenesses, in order to establish lines of descent. The splitting of faunas into minute groups has taught us the comparative value of characters, paving the way for more philosophical study of the genealogy of faunas. The torch of analysis lights the path for synthesis.

It will, of course, be obvious that a general idea of the *contents* of the principal divisions of Helicidæ as here distinguished, must be obtained before the geographic hypotheses can be rightly understood.

Acknowledgements and Thanks. That a large number of Helicoid groups are made known anatomically in this work is primarily due to the kindness and generosity of many conchologists who have supplied living or alcoholic material for dissection; and while it would be impossible to name here all those who have thus assisted me with specimens, notes on distribution, synonymy, etc., I must express my obligations for material for investigation to W. G. Binney, John Brazier, Alfred Caruana Gatto, Dr. J. C. Cox, Wm. H. Dall, Henry Hemphill, J. B. Henderson, C. W. Johnson, O. von Möllendorff, Morris Schick, Dr. Benj. Sharp, Dr. H. Simroth, Frederick Stearns, Henry Suter and Rev. R. Boog Watson. A series of mounted radulae which I owe to Rev. Prof. H. M. Gwatkin, has enabled me to illustrate the teeth of many interesting genera, among them *Oxychona*, *Macrocyclus*, *Albersia*, *Planispira*, *Entodina*, *Acavus* and others. My friend, Charles Hedley, of Sydney, has contributed not a little to views both systematic and theoretical expressed herein, but my main debt to him is for help more subtle than this.

To Mr. John Pousonby, of London, thanks are due for numerous rare or new species of *Helices*, many of which have been figured in the Manual, and more especially for the correction of errors in synonymy, localities, etc., occurring in previous volumes of this work. Mr. G. K. Gude has rendered me a similar service; and from a very large number of conchologists both in America and abroad, I have received information upon particular species and genera, for all of which I would here express my gratitude.

Summary. In this volume the author has essayed to indicate the primary groups of the *Helicidæ*, arranging the genera according to a few main types of internal structure, in place of the chaotic or arbitrary sequence of groups hitherto prevailing. The multitude of groups recognized are shown to be reducible to about fifty genera distinguished by structural features of importance, which are described and illustrated, lists of the living species of each genus being given. An outline of the distribution of the main groups is offered, with hypotheses of the probable migrations and phylogeny of these groups. Incidentally, the comparative value of the genitalia, shell, jaw and radula in classification, and the laws of their modification are worked out in some detail. Finally, the nomenclature of *Helices* has been thoroughly revised, and, it is hoped, placed upon a sound basis.

It rests with the critical and discriminating conchological public to decide whether the author of this volume shall undertake a companion work on the genera of *Zonitidæ* and *Agnatha*.

H. A. P.

MANUAL OF CONCHOLOGY, IX.

GUIDE TO THE STUDY OF HELICES.

INTRODUCTION.

I. NOTES ON THE GENERAL MORPHOLOGY OF HELICES.

SHELL.

In *Helices* the shell is always a well developed spiral, capable of containing the entire animal when retracted. It is generally wider than high, and coiled loosely so that the central column is hollow or umbilicate, but in some forms it is much higher than wide, and the umbilicus is closed in the adult by an expansion of the lip, or the whorls are coiled in close contact, forming a solid columella.

The general contour of the shell is excessively variable in all genera containing many species; and as the number of main types of form is limited, parallel groups or species occur in the various genera as shown in the following table:

Genera.	Shell globose,	Shell depressed,	Shell keeled.
<i>Helix</i>	<i>Pomatia</i> ,	<i>vermiculata</i> ,	<i>gualtierana</i> .
<i>Helicigona</i>	<i>Arianta</i> ,	" <i>Campylæa</i> ,"	<i>læpidea</i> .
<i>Epiphragmophora californiensis</i> ,		<i>mormonum</i> ,	<i>circumcarinata</i> .
<i>Eulota</i>	<i>Acusta</i> ,	<i>Euhadra</i> ,	<i>Plectotropis</i> .
<i>Helicostyla</i>	<i>Calocochlea</i> ,	<i>Corasia</i> ,	<i>Azina</i> .
<i>Polygyra</i>	" <i>Mesodon</i> ,"	<i>tridentata</i> ,	<i>obstricta</i> .
<i>Thersites</i>	<i>Xanthomelon</i> ,	<i>Badistes</i> ,	<i>Glyptorhagada</i> .
<i>Camæna</i>	<i>Phenicobius</i> ,	<i>xanthoderma</i> ,	<i>saturnia</i> .
<i>Obba</i>	<i>papilla</i> ,	<i>planulata</i> ,	<i>marginata</i> .
<i>Pleurodonte</i>	<i>nuxdenticulata</i> ,	<i>Isomeria</i> ,	<i>Curucolus</i> .

The list is capable of indefinite extension; and even those minor groups called "sections" often show the same series of changes in form, thus:

Sections.	Shell globose,	Shell depressed,	Shell lens-shaped.
" <i>Dentellaria</i> "	<i>nuxdenticulata</i> ,	<i>dentiens</i> ,	<i>lychnuchus</i> .
<i>Thelidomus</i>	<i>emarginata</i> ,	<i>petitiana</i> ,	<i>lima</i> .
<i>Pleurodonte</i>	<i>bronni</i> ,	<i>anomala</i> ,	<i>peracutissima</i> .
<i>Stenotrema</i>	<i>stenotrema</i> ,	<i>monodon</i> ,	<i>spinosa</i> .
<i>Axina</i>	<i>montfortiana</i> ,	<i>magister</i> ,	<i>siquijorensis</i> ,

That characters of contour are valueless for distinguishing genera in *Helices* is now conceded by students of the living groups, but palæontologists still use them; and for this reason the above tables are given.

The sculpture of *Helices*, like the contour, affords valuable specific characters, being subject to a wide range of mutation. Shells may be either smooth, obliquely striate, ribbed, decussated, granulated, malleated or hairy; and frequently several varieties of sculpture characterize different species of one genus, thus:

Genus.	granulate,	spirally striate,
<i>Helicigona</i>	<i>lapicida</i> ,	<i>arbustorum</i> ,
<i>Polygyra</i>	<i>palliat</i> a,	<i>albolabris</i> ,
<i>Epiphragmophora</i>	<i>tudiculata</i> ,	<i>intercisa</i> ,
<i>Pleurodonte</i>	<i>lima</i> ,	<i>petitiana</i> ,
ribbed,	hairy,	smooth.
<i>gobanzi</i> ,	<i>setosa</i> ,	<i>cingulata</i> .
<i>obstricta</i> ,	<i>hirsuta</i> ,	<i>jéjuna</i> .
<i>circumcarinata</i> ,	<i>rémondi</i> ,	<i>mormonum</i> .
<i>scabrosa</i> ,	<i>auridens</i> ,	<i>marginella</i> .

Sometimes upon a smooth or granulate surface there are papillæ or hairs arranged in regular obliquely decussating series, or in quincunx. This occurs in some species of *Chloritis*, *Helicigona*, *Thysanophora*, *Lysinoe*, *Hygromia*, etc. Some genera exhibit a wide range of variation in texture and color, but in most cases this is correlated with the habits of the species. Tree living snails are, as a rule, bright colored and tend to become elevated or conical, while ground snails are duller or brown, and usually depressed. Some genera, like *Helicostyla* in the Philippines and *Cepolis* in the West Indies, contain both arboreal and terrestrial forms, and consequently appear, on superficial observation, to be composed of very incongruous elements.

The embryonic shell (the portion formed within the egg), is found to vary greatly in size, and its extent compared to that of the adult

shell is a character of considerable value in classification. In *Helicophanta*, *Acavus* and their allies it is very large, sometimes one-third the diameter of the adult shell, and its junction with the post-embryonic growth is distinctly marked. In *Polygyra* it is very small and indistinct. In *Camæna* and allied groups it is of medium size. Some genera have the embryonic shell sculptured, as *Anoglypta*, *Chloritis*, certain species of *Helicigona* and *Pleurodonte*, but it is usually smooth and polished.

The *aperture* is usually crescentic, half-round or round, but in keeled species becomes angular, and in those having teeth it is often ear-shaped. The outer lip is expanded, reflexed or thickened within in nearly all the genera, but in some (*Sagda*, *Glyptostoma*, etc.) it is simple and sharp as in *Zonitidae*. Tooth-like processes are frequently developed upon the lip and parietal wall, and sometimes these become excessively complex. Usually there are two teeth upon the lip and one upon the body wall; totally diverse genera having independently evolved this arrangement. In a few groups there are internal plates or septa, far within the mouth.

The *banding of Helices*, although variable as a specific character, often shows considerable constancy in a genus or subgenus. Thus, in *Helix* the five-banded plan of coloring is usual. In *Helicigona* one- or three-banded; *Epiphragmophora* is one-banded. The band just above the periphery is the most constant, and may be found in most genera of *Belogona*. The *Epiphallogona* have their own band-arrangement, noticed on p. 103. Snails inhabiting dry situations or arid regions, deposit more lime in the shell than those living in moister places, and there is a strong tendency to split the bands into many narrow lines, as in *Euparypha*, *Helicella*, *Rhagada*, *Micrarionta*.

A convenient formula was invented by Georg von Martens many years ago, for the designation of band variations in *Helices*, especially the five-banded forms. The bands are numbered 1, 2, 3, 4, 5, beginning above. The absence of any band is indicated by a cypher; the coalescence of bands by parenthesis; and the splitting of a band by repetition of its number. Thus, the specimen shown in fig. 5, of plate 44, is *Helix nemoralis*, 12345. Fig. 4 is *H. nemoralis* 00000. Fig. 12 is *H. desertorum* 123(45). Pl. 43, fig. 44, is *H. sauleyi* 1(23) 40. A specimen with the bands united to conceal all the ground color would be (12345); and one with the third band split would stand 123345.

EXTERNAL FEATURES OF ANIMAL.

The general form of the animal in *Helicidae* is similar to that of *Zonitidae*, etc. The shell is carried on the middle or somewhat behind the middle, its axis being held oblique or vertical to the plane of the sole. The head has the usual eye-peduncles and tentacles, and more or less distinct labial lobes (see frontispiece, fig. 7). The mantle rarely projects beyond the lip-edge of the shell, and is generally provided with right and left body lobes (frontispiece, fig. 7, *r.l.* right lobe, *l.l.* left lobe). Sometimes the latter emits one or two small tongue-like processes on the left side (pl. 33, fig. 7). The back, from mantle to head, generally shows one or several *dorsal grooves*. The sides are granulated in various patterns, and often a groove extends from the lips obliquely upward to mantle on each side, the *facial grooves* (see pl. 33, figs. 7, 8; frontispiece, fig. 7). The tail in some genera has a median longitudinal groove (especially in *Epiphallogona*) or sometimes a serrate keel (*Lysinoe*, *Oxychona*). Usually, however, it is rounded above and shows no special features, being granulated like the sides, but more finely. In the *Endodontidae* and *Zonitidae* a deep longitudinal furrow runs parallel to the foot-edge on each side a short distance above it. These are the *parapodial* or *pedal grooves* (see pl. 14, fig. 46). They are absent in *Helicidae*. In *Zonitidae* and *Endodontidae* these furrows are often associated with a mucus-secreting pore at the tail. The sole or creeping disc is divided longitudinally into three bands or areas in some genera, but in most *Helices* such division is absent, or indicated by coloring only.

DIGESTIVE TRACT.

The *jaw* is well developed and usually strong and orange-colored in *Helices*. The types of jaw occurring in *Helicidae*, *Endodontidae*, and *Zonitidae* are

Polyplacognath (or unsoldered type of jaw, see pl. 1, figs. 4, 5, 6, 9) consisting of numerous *separate* plates, overlapping at their edges, and united by a common membrane only (*Punctum*).

Stegognath (or plaited, pl. 15, fig. 6, 7) composed of similar or narrower vertical plates soldered together, but with free, overlapping outer edges (*Flammulina*, *Sagda*).

Goniognath (or converging-plaited, pl. 42, fig. 36) same as *stegognathous* type, but outer imbricating edges of each plate converg-

ing toward the middle below, the median plate or plates triangular, not reaching the cutting margin (*Plectopylis*).

Aulacognath (or striated, pl. 15, figs. 1, 2) primary elements or plates completely soldered together, vertically striated (*Pyramidula*).

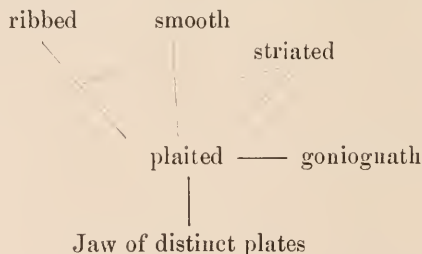
Oxygnath (or smooth, pl. 21, fig. 8) completely soldered, smooth (*Leucochroa*).

Odontognath (or ribbed, pl. 21, fig. 11) completely soldered, having convex vertical ribs, projecting at one or both edges (*Helix*).

The most primitive type of jaw occurring in recent terrestrial Pulmonata is found in the Polyplacognatha, *Punctum* and *Laoma*. By the partial union of the loose plates of this sort of jaw, the Stegognathous type is formed. The goniognath form as seen in *Liguus*, *Orthalicus*, etc., is a mere variant of this low stegognath type, and can hardly be considered a primary type. In the *Aulacognatha* the plates have become completely soldered, although their edges still show as striæ; and finally in the *Oxygnatha* these striæ disappear, leaving a completely smooth jaw. In the *Odontognatha*, vertical ribs are developed upon its anterior face. The data supplied by anatomy and embryology indicate the above as the general phylogenetic sequence of the various types of jaw; but the *Oxygnatha* consist of two sections of different genesis. In some forms (such as the typical *Sagdus*) the jaw has apparently been evolved directly from the stegognathous type; and this is probably true likewise of the *Helicophanta* group. In others (such as some species of *Pleurodonte*, and *Helicostyla*, the genera *Obba*, *Cepolis*, *Leucochroa*, *Allognathus*, etc.) a smooth jaw has resulted from the degeneration of the ribs on an odontognathous type. The ribbed or odontognathous type has in some cases been formed upon a plaited jaw. In other cases it may have been formed upon a smooth jaw, but evidence is lacking to establish this. In certain cases (such as *Hygromia*) the degeneration of a ribbed jaw has resulted in one approaching the plaited type. It must also be understood that the distinction between the goniognathous, stegognathous, aulacognathous and oxygnathous types is in some cases not well defined, and often it is not possible to distinguish between a *primarily* or *secondarily* oxygnathous or smooth jaw, although it is practically demonstrated that the *Oxygnatha* are diphyletic.

It therefore appears that at the time the main phyla of monotremate, jaw bearing land snails diverged, they were provided partly with a jaw of unsoldered plates, partly with one of the incompletely

united type (stegognathous or plaited). In the *Helicoids* the majority of forms acquired the firmer and completely united smooth or ribbed type, although some still retain the primitive, incompletely united forms, as seen in *Punctum*, *Flammulina*, *Thysanophora*, etc. In the *Zonitidæ* the oxygnathous type has been very generally acquired, although a few forms retain a modified plaited jaw. In *Bulimulidæ* (which includes the "*Orthalicidæ*") the plaited type of jaw has been retained with various modifications, and the same is found in *Cylindrellidæ*. The *Pupidæ* have a completely united, striated jaw. The *Achatinidæ* have a striated or ribbed jaw. It appears that the various families, starting with an incompletely united jaw, have been very unlike in the degree of development attained; some preserving the ancestral form until to-day, but in most a stronger, solid jaw has been acquired through various well understood successive stages, occasionally parallel in several phyla. These considerations show that the various classifications of land mollusks by jaw characters are artificial; the various "types" of jaw on which it is founded representing merely successive stages of progress from an incoherent or incompletely united, to a solid jaw, and these stages have been independently reached or passed through by several totally diverse branches of the pulmonate trunk. The history of the various jaw types is shown in the following diagram.



The two lower stages were probably passed through by the majority of families in common; the others were reached by various groups independently and by their own special routes. In most families of land snails, two or more of these types are represented among the various genera.

THE RADULA in *Helicidæ* is of the strap-like form usual in *Pulmonata*, the individual teeth having squarish basal plates. In even the lowest types now existing, the multicuspid form of tooth of the primitive Pulmonates has given way to the tricuspid type (see pl.

15, figs. 3, 4), although in some forms more cusps remain on the outermost teeth. The individuality of these three cusps is remarkably fixed; for however completely the typical tricuspid form may be changed, it is always possible to identify the three primitive elements, or such of them as are retained.

In the study of Helicid radulæ, and especially those departing widely from the typical structure, it is essential to recognize at the outset—

The law of mesometamorphosis: *All modifications in the teeth proceed from the median line of the radula outwards toward the edges, the outer marginal teeth being the last to be modified.*

A study of the marginal teeth, therefore, gives a clue in many cases to the ancestral condition of a much modified radula; although in certain groups the change has been so long established and has proceeded so far that even the outermost teeth no longer retain their primitive form. In such cases recourse must be had to the radulæ of young individuals or embryos still unhatched, which sometimes retain an ancestral type of teeth (see Sterki, Proc. Acad. Nat. Sci., Phila., 1893, p. 388).

The evident reason why the order of tooth-changes stated above should obtain, is that the median portion of the radula is the part most used on account of its position and the convex boss-like shape of the subradular cushion.

The most frequent departure from the tricuspid type of tooth is seen in the lateral teeth of most Helices, in which the inner cusp (entocone) is lost, or more commonly its cusp is united with that of the middle cusp (mesocone) as a lateral extension of the latter. In many groups both inner and outer cusps of rhachidian and lateral teeth are suppressed in this manner (see pl. 34, fig. 9), but all three cusps reappear on the marginal teeth, which are less modified. Usually the outer marginals have the ectocone, or outer cusp, split or bifid, a reminiscence of the early multicuspid teeth which were part of the heritage of the Pulmonates from their Tectibranch ancestors.

Radulæ with teeth tricuspid in whole or part. In many *Endodontidæ* and minute forms of other groups, the teeth are all tricuspid (see plates 8, 9). This form of teeth is usually correlated with small size and strictly terrestrial habits.

Radulæ with all teeth unicuspid. In a few genera the loss of side cusps has extended to even the outermost teeth of the radula (see

pl. 51, figs. 1, 2, and pl. 48, all figs.). This modification is especially characteristic of one of the primary divisions of Helices, but occurs also on a few isolated genera, such as *Allognathus*, of other phyla.

Radule of arboreal snails. Data presented in the systematic portion of this volume establish the fact that *arboreal snails always assume teeth with broad, gouge-like cusps*, in place of the slender, pointed cusps of ground snails, and regardless of the form of teeth prevailing in the family stocks whence they were derived. Cases in point are *Polymita*, *Amphidromus*, *Orthalicus*, *Papuina*, *Cochlostyla*, *Oxychona*, etc., etc. Some apparent exceptions are due to the very recent assumption of arboreal habits by certain forms; the change of teeth lagging behind the change of station, as in the arboreal forms of the genus *Cepolis*.

This modification goes hand in hand with the change in *shell* features; arboreal forms always becoming light or bright colored, often having a color-scheme in vivid hues of green, yellow, orange or pink; while the most nearly allied terrestrial species or genera have the shell of dusky or inconspicuous shades of brown.

In some tree snails the middle cusp only is modified into a broad gouge, the side cusps remaining as rudimentary basal spurs, which become larger on the outer edges of the radula, in accordance with the general law formulated above. An instance is *Oxychona*, pl. 51, figs. 9, 10, (*o* being the rhachidian tooth). Again, the *three* cusps are retained and enlarged on all the teeth, as in *Polymita*, pl. 51, figs. 5, 6, 7. (Fig. 7, outermost marginals; compare pl. 57, fig. 48, a marginal of *Cepolis*, the genus most nearly allied). The same has occurred in *Papuina*, pl. 37, figs. 1, 10.

As a general rule, groups of greater value than genera cannot be based upon these special modifications of the tricuspid type of teeth. And on account of the fact that similar modes of life produce similar tooth-forms in widely different groups, these peculiarities can have comparatively little weight in fixing the place in the general system or the family affinities of any genus.

The salivary glands, stomach, liver and intestine have not been observed to offer differences of taxonomic value in the Helices, although I have observed variations in certain genera. An extended series of observations of these organs is necessary.

REPRODUCTIVE SYSTEM.

General considerations:—Helicidæ, like all pulmonates, are hermaphrodites, the male and female genitalia uniting below in a com-

mon cloaca, the *atrium* or *vestibule*. It is now held that the hermaphrodite condition is secondary in mollusks, the male organs being superimposed or grafted upon the female individual (see Pelseneer Quart. Journ. Mic. Sci. 1894, p. 19). The proofs for this view coming from many sides, all indicate that in the primitive mollusks the sexes were separate.

Embryological data indicate that the entire generative system except atrium, penis sack and their special appendages, are of mesodermal origin. Simroth is probably right in holding that the atrium and evertible penis (but not epiphallus) are ectodermal evaginations. The case of *Limax primitivus* which he cites to prove that the penis has been "pulled out" from the atrium, is, however a case of degeneration in all probability. It is very probable that the penis in land mollusks is strictly homologous with that of Tectibranchs, and its union with the female organs at the atrium has been brought about by the gradual moving forward of the female orifice, originally posterior in position.

It seems likely that the dart apparatus is primarily an outgrowth from the atrium, although in some cases it has moved upward on the vagina. It is not homologous with the dart sack of *Philomycus*, nor with that of certain *Zonitidae*. The gland or sack upon the penis, called the *appendix*, is probably a very ancient character, and is homologous with that sometimes developed upon the atrium (see *Helicella*), but not with the blind sack found high on the vagina in such forms as *Panda*, etc., which seems to be an independent growth from the vagina, probably serving as a temporary receptacle for spermatophores (packets of spermatozoa), analogous to the diverticulum of the spermatheca duct. Although both male elements (spermatozoa) and female (ova) are produced in the same acini of the hermaphrodite gland, the former ripen first, and passing down are enclosed in a leathery or chitinous case, the spermatophore ("*capreolus*") secreted by flagellum or epiphallus. In forms lacking these the spermatophore is absent. In the female system these spermatophores are stored in the spermatheca and its appendages, pending the ripening of eggs and their passage downward. The dart apparatus is only a stimulating organ, the dart being thrust from one individual into another during copulation. Von Ihering considers the papilla in the penis also a sensory organ. The function of the penis-gland is unknown. During copulation the penis is everted in most *Helices*, but in some there are reasons for

believing that the atrium only is thrust outward. Further investigations of snails during breeding are needed.

Description of organs:—The external opening of the genitalia lies a short distance behind and below the right (or in sinistral species the left) eye-peduncle. This opens into a short chamber the *atrium* (Frontispiece, *atr.*), from which the penis (*p.*) branches toward the digestive tract, and the vagina (*vag.*) toward the outer side. The *penis* (*p.*) is a tube with muscular walls, usually corrugated within, and sometimes having longitudinal fleshy pillars (*pilusters*, pl. 21 fig. 14, 15) adherent along one side to the wall of the cavity. At its distal end the *vas deferens* (*v. d.*) enters, its opening being sometimes at the base or summit of a papilla (the *penis papilla*, pl. 28, fig. 2). The *penis retractor* muscle (*r.*) is inserted on the penis or its appendages, and attached distally to the floor of the lung. The *vagina* (*vag.*) branches above into the *spermatheca duct* (*sp. d.*) which terminates in the *spermatheca* (*sp.*); the other branch (*uterus, ut.*) becoming enlarged and sacculated. At the apex of the uterus the *albumen gland* (*a. gl.*) supplying the albumen of the eggs, is attached; from near its base the *ovisperm duct* springs, and terminates in the *hermaphrodite gland* (*h. gl.*).

Besides the above essential organs, the genitalia of many snails are complicated by the presence of various accessory organs. On the male side the penis may bear a gland or sack of unknown function, called the *appendix* (see pl. 21 fig. 1, 2, 3). This structure may be near its apex, at its base, or even on the atrium. In some groups the vas deferens does not enter the penis directly, but becomes modified into a larger tube the *epiphallus* (*epi.*) which is continued beyond the apex of penis and frequently bears a long blind duct, the *flagellum* (*fl.*).

The female side in some groups is provided with a muscular sac upon the vagina (or atrium), the *dart sack* (*d. s.*), containing a needle or dagger-like calcareous *dart* (see frontispiece, fig. 5, section of dart sack, showing dart). Associated with this apparatus are found one or several glands, various in form, the *mucus glands* (*m. gl.*). In certain forms there is a curved hollow appendage high upon the vagina, which probably serves as a receptacle for spermatophores, and has been called the *appendicula* (see pl. 17, fig. 1). The duct of the spermatheca in some *Helices* bears a long blind tube, the *diverticulum* (see pl. 63, fig. 8).

The musculature of the genitalia is often a character of some value. The penis retractor may be inserted either on the penis itself, or on the epiphallus; and in a few cases it is split, having a double or triple insertion. Distally it is attached normally to the lung floor, but in a few cases to the vagina, or to the main columellar retractor of foot and buccal mass. In a few groups the penis retractor is absent. The vagina in some cases is attached to the adjacent body wall by a broad band-like muscle. The dart sack has no retractor, but in certain genera its apex is connected with the vagina. The retractor of the right eye-peduncle in most genera passes between the penis and vagina; but in a few it passes to the left of the penis. These myologic features are of considerable importance in classification; and the variation in the distal insertion of the penis retractor in some forms, as well as the abnormal position of the eye-retractor in others, are difficult to explain.

II. HISTORICAL SKETCH OF THE CLASSIFICATION OF HELICES.

Five epochs may conveniently be recognized in the taxonomic history of land mollusks. I, Linnæan epoch; II, Lamarckian epoch; III, Ferussacian, IV, Beckian, V, Albers-Martensian; each of these being initiated by the appearance of some work largely remodelling the system of classification.

I, 1758-1799. The LINNÆAN EPOCH was characterized by the wide limits and heterogenous contents of its genera, although in a broad sense most of them have proved to be natural groups. Linnæus himself and his successors in Germany, France and England until the time of Lamarck, are the exponents of this period.

II, 1799-1819. LAMARCKIAN EPOCH. The genus *Helix* of Linnæus was much restricted about the beginning of the present century by the segregation of its most diverse elements by LAMARCK and DRAPARNAUD; the *Limnophila*, *Clausilia*, *Pupa*, *Succinea*, *Achatina*, etc. being removed to form distinct genera. Within the group of forms retained in *Helix*, but few divisions were made, and such genera as were instituted during this epoch were mainly based on one or a few peculiar species, no attempt being made to classify the entire series. Fischer de Waldheim (about 1808), Montfort (1810), Schumacher (1817) are the principal contributors to this literature.

III, 1819-1837. FERUSSACIAN EPOCH. The *Tableaux Systematique de la Famille des Limaçons* presented the first consistent attempt

to classify the *Helices* into subgeneric groups. After dividing the shell-bearing terrestrial inoperculate pulmonates into six genera, *Helixarion*, *Helicolimax*, *Helix*, *Polyphemus*, *Vertigo* and *Partula*, Ferussac proposes the following system for *Helix*:

† Redundantes.

Volutatæ, *Helicoides*, subgenus *Helicophanta* [=Daudebardia, Aerope, *Helicophanta*].

Evolutæ, *Cochloides*, subgenus *Cochlohydra* [=Succinea].

†† Inclusæ.

Volutatæ, *Helicoides*, subgenus *Helicogena* [=all globose *Helices*].
 subgenus *Helicodonta* [=all toothed *Helices*].
 subgenus *Helicigona* [=all keeled toothless *Helices*].

subgenus *Helicella* [=depressed, mostly simple lipped *Helices* and *Zonitidæ*].

subgenus *Helicostyla* [=elevated *Helices*, not keeled].

Evolutæ, *Cochloides*, subgenus *Cochlostyla* [=Bulimoid forms, imperforate, with entire mouth].

subgenus *Cochlitoma* [=Liguus, Achatina].

subgenus *Cochlicopa* [=Glandina, Stenogyra, Ferussacia].

subgenus *Cochlicella*, [=Cochlicella, Rumina, etc.].

subgenus *Cochlogena* [=Limicolaria, Bulimus, Achatinella, etc.].

subgenus *Cochlodonta* [=Pupa, Strophia, Gibbus, etc.].

subgenus *Cochlodina* [=Cylindrella, Clausilia, Buliminus].

Each of these subgenera is divided into several groups designated by terms expressive of their peculiarities, thus:

S.-g. <i>Helicella</i> {	Lomastomæ, Aplostomæ, Hygromanes, Heliomanes,	S.-g. <i>Helicostyla</i> {	Aplostomæ. Lamellatæ. Canaliculatæ. Marginatæ.
--------------------------	--	----------------------------	---

These divisions of the subgenera were not intended in the sense of sub-subgenera and should not be used in such sense. Many of them

were repeated in several subgenera, and it is only by accident that any of them are acceptable in form. Such names as *Hyalina* (*Hyalinæ* Fér.), *Heliomanes*, etc., cannot date from the *Tableaux*. The subgeneric divisions of Férussac's system are based almost wholly upon *contour*, one of the least stable characters of *Helices*. The system is, therefore, wholly artificial. Other writers of this epoch are Risso (1826), who by restricting the heterogeneous subgenera of Férussac, fixed their types; Leach, whose subgeneric names are quoted in the synonymy of Turton's work (1831); Fitzinger (1833), who proposed generic names for many European groups; and Charpentier (1837) who publishes certain names proposed by Agassiz. The latter three authors did not work on Férussacian lines, but may rather be regarded as foreshadowing the next epoch.

IV, 1837-1860. BECKIAN EPOCH. A great advance in Helicology marked the year 1837. The period of artificial classification waned; and with the works of HELD and of BECK a new period dawned. Held's work applied only to the European *Helices*; but Beck included all known species in his classification. Discarding the arbitrary contour-grouping, Beck formed his subgenera upon the elusive and less striking, but far more stable features of shell structure and texture, form of lip and columella, etc. A large proportion of the groups proposed in the *Index Molluscorum* are still retained in essentially their original limits. Although founded upon shell characters only, Beck's classification is a vast advance upon previous work; and indicates a mind of rare subtlety and discrimination. During the decade following Beck's publication, several notable works upon *Helices* appeared. Swainson (1840) attempted to apply the "quinary system," proposing at the same time some new genera. Hartmann (1840-1844) also made additions to the list of names, and PFEIFFER, whose name was to be henceforth so intimately associated with all departments of Pulmonate species-work, published the *Symbolæ ad Historiam Heliceorum* (1841-'42), and in 1848 the first volume of the famous *Monographia Heliceorum*. Pfeiffer's main strength was in the discrimination and concise, explicit, description of species, and in the careful sifting of synonymy; and in these lines his work has been of incalculable benefit to science. As a systematist his views were not especially original.

J. E. Gray issued in 1847, a list of genera with their types; and this publication fixes definitely the type species of a number of old genera of *Helices*, such as *Obba*, *Cochlostyla*, etc.

The publication of Albers' *Die Heliceen*, in 1850, marked a distinct advance in the discrimination of natural groups throughout the land snails; but the general principles followed do not differ radically from those of Beck. In 1855 Pfeiffer published a somewhat amplified arrangement, with some new subgeneric names; and in the same year the brothers Adams reached the *Helices* in their *Genera of Recent Mollusca*. The classification adopted in this work differs widely from previous arrangements; but as its original features are nearly all either retrogressive or founded upon fallacious characters, the generic and subgeneric scheme need not be quoted here. Reeve's monograph of *Helix* in the *Conchologia Iconica* (1851-1854) supplied the first illustrations of a multitude of species, chiefly those of Pfeiffer. Dr. Binney's *Terrestrial Mollusks of the United States* (1851-1857) gave a magnificent series of plates of American forms, among the best portraits of snails ever published; and the work of Dr. Joseph Leidy therein, was the first anatomical investigation to be made on American Mollusks.

In France, Moquin-Tandon was preparing a faunal work of the same thorough character, which was issued in 1855, with sumptuous colored plates and well-drawn anatomical details of the snails of France.

Simultaneous with the last, Adolph Schmidt published his *Geschlechtsapparat der Stylommatophoren in taxonomischer Hinsicht* (Berlin, 1855), a classic work, ranking with that of Semper in the grasp of principles, and laying a broad foundation for the comparative study of snail genitalia. Schmidt establishes upon anatomical data the groups *Pentatenia* (= *Helix* s. str.), *Fruticicola*, *Xerophila*, *Campylæa*, shows the true relationships of the *carthusiana* and *nummus* groups and of *H. pisana* and *personata*, separates *H. obvoluta* from the *personata* group, etc. Many of these notable improvements in classification have since been completely lost sight of by recent European conchologists, and are only of late fully appreciated.

The work of Schmidt belongs to the Beckian period only chronologically. In insight and genius it is altogether modern.

V, 1860— . ALBERS-MARTENSIAN EPOCH. While several works of the decade preceding 1860 were far in advance of the standpoint of Beck, yet their scope was not sufficiently wide to create any general change in the views of *Helix* classification held in various countries. The appearance of the second edition of Albers' *Die*

Heliceen, edited by von Martens, marked a period closed, and a new epoch begun.

As the classification given in this work has been the basis of nearly all subsequent systematic arrangements, it is here quoted in full. The brackets indicate that groups so united are supposed to be closely allied. For purposes of comparison I have given in Roman type the names of the super-generic groups of this volume, under which each of the Albers Martensian subgenera falls, these groups being as follows:

Endodontidæ: Haplogona, Polyplacognatha.

Helicidæ: Protogona, Teleophallogona, Epiphallogona, Belogona
(with two divisions, Bel. Euadenia and Bel. Siphonadenia), Macroögonia.

Vitrinea.

Genus *SAGDA* Beck (Teleophallogona).

Hyalosagda, *Proserpinula*, *Odontosagda*.

Genus *LEUCOCHROA* Beck (Belogona).

Helicacea.

Genus *HELIX* L.

<i>Amphidoza</i> , Haplogona.	<i>Acanthinula</i> , Belogona.
<i>Microphysa</i> , Teleophallogona.	<i>Vallonia</i> , Belogona.
<i>Aerope</i> , Rhytididæ.	<i>Petasia</i> , Belogona.
<i>Pella</i> , Haplog. & Zonitidæ, etc.	<i>Fruticicola</i> , Belogona.
<i>Patula</i> , Haplogona.	<i>Dorcasia</i> , Protogona & Belogona.
<i>Charopa</i> , Haplogona.	<i>Rhagada</i> , Epiphallogona.
<i>Stephanoda</i> , Haplogona.	<i>Xerophila</i> , Belog. Siphonadenia.
<i>Rhytida</i> , Rhytididæ.	<i>Turricula</i> , Belog. Siph.
<i>Janulus</i> , Zonitidæ.	<i>Cochlicella</i> , Belog. Siph.
<i>Endodonta</i> , Haplogona.	<i>Ochthephila</i> , Belogona.
<i>Sesara</i> , Zonitidæ.	<i>Actinella</i> , Belogona.
<i>Pelia</i> , Zonitidæ.	<i>Tectula</i> , Belogona.
<i>Gonostoma</i> , Belog. siphonadenia.	<i>Plectotropis</i> , Belog. Euadenia.
<i>Ophiogrya</i> , Protogona?	<i>Aegista</i> , Belog. Euad.
<i>Polygyra</i> , Protogona.	<i>Aglaiia</i> , Belog. Euad.
<i>Stenotrema</i> , Protogona.	<i>Campylæa</i> , Belog. Siph.
<i>Triodopsis</i> , Protog. & Belog.	<i>Eurycampta</i> , Belog. Euad.
<i>Mesodon</i> , Protogona.	<i>Arionta</i> , Belog. Siph. & Euad.
<i>Laoma</i> , Polyplacognatha.	<i>Eurystoma</i> , Epiphallogona.

<i>Euparypha</i> , Belog. Siph.	<i>Labyrinthus</i> , Epiphallog.
<i>Tachea</i> , Belog. Siph.	<i>Isomeria</i> , Epiphallogona.
<i>Macularia</i> , Belog. Siph.	<i>Caraculus</i> , Epiphallogona.
<i>Iberus</i> , Belog. Siph.	<i>Phania</i> , Macroögonia?
<i>Coryda</i> , Belog. Euadenia.	<i>Thersites</i> , Epiphallogona.
<i>Hemicycla</i> , Belog. Siph.	<i>Merope</i> , Epiphallogona.
<i>Plebecula</i> , Belog. Siph.?	<i>Obba</i> , Epiphallogona.
<i>Leptaxis</i> , Belog. Siph.	<i>Trachia</i> , Epiphallogona.
<i>Pomatia</i> , Belog. Siph.	<i>Planispira</i> , Epiphallogona.
<i>Thelidomus</i> , Epiphallogona.	<i>Phasis</i> , Haplogona?
<i>Cysticopsis</i> , Belog. & Teleoph.	<i>Chloritis</i> , Epiphallogona.
<i>Plagioptycha</i> , Belog. Euad.	<i>Pedinogyra</i> , Macroögonia.
<i>Polymita</i> , Belog. Euad.	<i>Ampelita</i> , Macroögonia.
<i>Liocila</i> , Epiphallog. & Belog.	<i>Solaropsis</i> , ?
<i>Euryeratera</i> , Epiphallogona.	<i>Canena</i> , Epiphallog., & Belog.
<i>Polydotes</i> , Epiphallog.	<i>Hadra</i> , Epiphallog., & Belog.
<i>Helicophanta</i> , Macroögonia.	<i>Papuina</i> , Epiphallog.
<i>Panda</i> , Macroögonia.	<i>Leptoloma</i> , Belog. Euadenia.
<i>Stylodon</i> , Macroögonia, Belog.	<i>Geotrochus</i> , Epiphallog. & Belog.
<i>Erepta</i> , Zonitidæ.	<i>Cymotropis</i> , Epiphallogona.
<i>Dentellaria</i> , Epiphallogona.	<i>Chloræa</i> , Belog. Euadenia.
<i>Cepolis</i> , Belog. Euad.	<i>Corasia</i> , Belog. Euadenia.
<i>Pleurodonta</i> , Epiphallogona.	<i>Axina</i> , Belog. Euadenia.
<i>Anostoma</i> , Pupidæ.	<i>Callicochlias</i> , Belog. Euadenia.

Genus COCHLOSTYLA Fér. Belogona Euadenia.

The general plan of this arrangement is to establish a series leading from Zonitoid to Bulimoid shells; and the characters mainly depended upon in the formation of groups are texture, form of lip, and general contour of shell. In the appreciation of that indefinable something, which counts for so much in classifying Helices, the authors of *Die Heliceen* are far beyond all previous work; and it is this quality—this accurate *feeling* for subtle affinities for which no good reason can be given in words—that has rendered this work the basis of classification for three and a half decades, a long period in so changeable a science as malacology.

It would be obviously unfair to criticise this great work by standards of the new anatomical classification, for excepting the *Haplogona*, *Protogona* and *Belogona*, the Helices were practically unknown anatomically in 1860. Compared with the new system, it is noteworthy that the *Haplogona* are mostly grouped together near the Zonitidæ, where they unquestionably belong; and many other felicities of grouping will be obvious to one looking over the list, besides the genius shown in forming natural subgenera, already referred to. For the rest, the *Epiphallogona*, *Belogona*, *Teleophallogona*, *Proto-*

gona and *Macroögonia* are indiscriminately grouped; but with the exception of the last named, which has good conchological peculiarities, one would expect this; for there are no diagnostic characters of these super-generic groups to be found in the shells alone.

The work of Pfeiffer, although begun in the last period, extended through the greater portion of this one. Final results of this great series of monographs are given in the *Nomenclator Heliceorum Viventium*, edited by Clessin (1878). The system of classification differs but little from that of Albers-Martens.

The successive papers and volumes of Binney and Bland upon the land shells of America, although based on Die Heliceen, have made notable improvements in the treatment of cis-Atlantic groups, largely the result of Binney's work upon the jaws and radulæ of United States and West Indian species. The work of Tryon upon *Helices* has been based upon conchological studies only, and is essentially a modified form of the Albers-Martensian. Fischer likewise gave no weight to anatomical characters in his treatment of *Helices*.

The systematic work of Mörch, although begun in 1859 (*Mal. Bl.* vi, 109), belongs to this epoch rather than the last. Fully recognizing the unreliability of groupings based upon shell-contour, he proposes to use the jaw as a basis for dividing land snails into primary groups. The arrangement given is as follows, the genera of *Helicidæ* being italicised:

1. OXYGNATHA. Jaw with a projecting tooth, *Limax*, *Vitrina*, *Succinea*, *Helicella*, *Zonites*, *Leucochroa*, *Ryssota*, *Obba*, *Caracolla*, *Otala*, *Pleurodonta*.
2. AULACOGNATHA. Jaw striated, with crenulated margin. *Euryomphala*, *Bradybæna*, *Sagda*, *Cochlicella*, *Rumina*, *Pupa*, *Clausilia*.
3. ODONTOGNATHA. Jaw with separated cords which form teeth at its margin, *Arion*, *Ariolimax*, *Nanina*, *Teba*, *Pomatia*, *Helicogena*, *Helicogona* (*Campylæa*), *Achatina*, *Limicolaria*, *Bulinus*.
4. GONIOGNATHA. *Orthalicus*, *Pseudostrombus* (= *Liguus*).
5. AGNATHA. *Oleacina*, *Testacella*.

In 1865 (*Journ. de Conchyl.*) this idea is further elaborated and the *Elasmognatha* added. As I have shown on a previous page (xi), the jaw is as unreliable as the shell; and the family groups

based upon it are almost always artificial. Still, the attempt to use internal features was in itself a move in the right direction.

The above classification paved the way for the great work of Dr. Carl Semper, *Reisen im Archipel der Philippinen, Landmollusken*. In this, the most extensive work yet published upon the soft anatomy of land mollusks, a great number of genera in all families of snails are made known anatomically, the following scheme of classification being adopted.

Family ZONITIDÆ: tail with gland; marg. teeth aculeate, etc.

Family HELICIDÆ: no caudal mucus-gland.

Vitrininae: Sole divided, margined; jaw smooth; marginal teeth thorn-like. *Limax*, *Vitrina*, *Parmacella*, *Vitrinoconus*, *Vitrinoidea*, *Hyalina*.

Helicinae: Sole undivided; jaw various; marginal teeth short, several-cusped.

Oxygnatha:

Teeth unicuspid: *Acavus*, *Corilla*, *Caryodes*, *Panda*, *Caraculus*, *Labyrinthus*.

Teeth broad, several-cusped.

Tentacles 2. *Janella*.

Tentacles 4; jaw with accessory plate: *Succinea*.

Tentacles 4; jaw with no accessory plate: *Oopelta*, *Trochomorpha*, *Planispira*, *Obbina*, *Strophia*, *Sagda*.

Aulacognatha: *Philomycus*, *Cionella*, *Tornatellina*, *Stenogyra*, *Endodonta*, *Buliminus*, *Pupa*.

Odontognatha:

No accessory organs on genitalia: *Achatina*, *Amphidromus*, *Bulimus*, *Otostomus*, *Partula*, *Hadra*, *Pleurodonta*, *Polygyra*, *Trachia*.

Genitalia with accessory organs: *Cochlostyla*, *Chloræa*, *Eulota*, *Xerophila*, and other genera [this group of Semper's is the foundation of v. Ihering's "*Helicidæ*" and Pilsbry's "*Belogona*"].

Goniognatha: *Orthalicus*.

Agnatha: *Rhytida*, etc., etc.

Family ONCHIDIDÆ.

Family VAGINULIDÆ.

Although founded upon the arrangement of Mörch, this classification exhibits a distinct advance, not only in the recognition of the

subordinate value of the jaw structure (which Semper considered of much less moment than would be thought from the above table), but in the partial recognition of the value of features of the genitalia, teeth, mantle, foot-grooves, etc., here for the first time made much use of in classification. The great number of genera investigated anatomically, and the admirable way in which the work was done, have made Semper's work a classic in malacological literature. The principal defects of the classification are the exaggerated importance given to the mucus tail gland, and the structure of the jaw. Moreover, shell characters were practically ignored—an extreme view, not borne out by broader investigations.

During the Albers-Martensian epoch, much good detail work upon the anatomy of *Helices* has been done by investigators using *Die Heliceen* and Semper's *Reisen* as their main reference books. Among these may be mentioned the work of W. G. Binney, Wiegmann, Pfeffer, Schuberth, Brancsik, Lehmann, Fischer, Tapparone-Canefri, Hutton, Hedley, Suter, Hesse, Pollonera, Braun, Morse and others referred to in the text of this volume. Moreover, the advance in knowledge of the shell has been unparalleled, many acute and talented conchologists giving their energies to the elucidation of the *Helix* faunas of every quarter of the world, and bringing to scientific knowledge a vast number of interesting species, as well as adding enormously to the data for zoögeography.

During the years 1889–1892 the writer published anatomical data upon various *Helices* bearing upon a new classification of the entire group, these memoranda being practically the basis of the present volume.

The *Morphologie und Systematik des Genitalapparates von Helix*, by Dr. H. von Ihering, appearing in 1892, has exercised a wide influence upon views of *Helix* classification, and placed the main European genera upon a firm basis. In this powerful essay, v. Ihering adopts the second division of Sempers' *Odontognatha* as a group of family rank, the *Helicidae*, with the following genera: *Xerophila*, *Fruticicola*, *Helix* [= *Pentatænia* Schm.], *Campylæa*, *Gonostoma*, *Dorcasia* [= *Eulota*], *Cochlostyla*. He also treats of *Neohelix* (new name for *Polygyra* Say), but does not attempt to show its affinities; and the exotic *Helices* of which the relationships were unknown to him are placed under the new genus *Parahelix*. The great merit of this work lies in its advanced views regarding the value of the various modifications of the genitalia in

systematic malacology, the role played by degeneration, and in formally adopting and suitably characterizing the main European genera as originally outlined by Schmidt. In the preliminary classification proposed by the writer (Proc. Acad. Nat. Sci. Phila. 1892, p. 392) these European groups were placed as subgenera of *Helix*, but a fuller study of the subject has resulted in the adoption of the genera defined by von Ihering.

III. NEW CLASSIFICATION OF HELICES.

It will be seen by reference to the preceding pages that the classification of Helices has been based hitherto mainly upon the modifications of a single organ, such as the shell or the jaw; and that even the best of these classifications have yet given no clue to the relations the various groups of different life-areas bear toward one another, nor have they even remotely suggested any phylogenetic lines. In the present volume the attempt has been made to found a system of grouping based upon several organs, and one expressive of the facts of phylogeny and zoögeography.

Single-organ classifications are even more than usually dangerous in Pulmonates for we find that they have, like their ancestors the Tectibranchs, an extremely plastic shell which shows many cases of parallel or "converging" development, and frequently becomes reduced to a functionless remnant, in members of widely different families, and their mouth parts are subject to great changes in nearly allied groups. The Prosobranchs show no such wide range of mutability in either shell or radula.

It is generally held by biologists that a classification which takes cognizance of several totally diverse, uncorrelated organs, is more reliable than one based upon a single organ; for the reason that while some one organ or system of directly correlated organs, may independently assume similar forms in members of different stocks or phyla, when they are subjected to similar conditions of life, the probabilities are remote that several organs not directly correlated will be simultaneously so modified. Again, the ancestral form of a certain organ may be retained in several groups widely diverse in other respects; and moreover, the taxonomic value of a given structure varies widely in different families or genera.

Another consideration of weight in selecting characters for a phylogenetic classification, is the fact that peripheral organs, or those *directly* acted upon by external forces, are most readily remoulded

or modified by these influences, while internal organs are much less directly acted upon, and lag behind in the process of transformation. For this reason, specific characters as well as those of sections or subgenera are mainly drawn from the shell, while generic features are usually found in the dentition, jaw and genitalia. As a rule, these internal organs in any genus, show a far smaller range of variation than the shells. In this connection it may be noted that the appendages or organs of the foot (such as operculum, mucus glands, pedal grooves, etc.) show much less variation in any natural genus or family than the mantle organs (shell, mantle lobes, etc.).

The generally acknowledged facts recited above, with the conclusions reached regarding the taxonomic value of the shell (page vii), the jaw (p. xi) and the teeth of the radula (p. xiii), have as their logical outcome, caused us to form a classification of the land snails based upon all the main features of the animal economy, special dependence being placed now upon one, now upon another system of organs. Former arrangements of the genera based upon one or two organs, must sooner or later be abandoned. Neither jaw, teeth or shell, taken singly, prove to be sufficiently stable, nor is v. Ihering's primary division of Pulmonata into *Micronoten* (small-mantled, such as *Helix*, *Limax*, *Pupa*), and *Meganoten* (large-mantled, as *Vaginulus*, *Philomycus*), any more natural.

In the opinion of the writer, a natural classification of Pulmonates should be based upon:—

- Organs of protection (shell, mantle, integument of body).
- Organs of locomotion (foot with pedal-grooves, tail gland, etc.).
- Organs of reproduction (genitalia, comparative size of eggs, etc.).
- Organs of nutrition (jaw and teeth, intestinal tract, kidney).
- Nervous system (including sense-organs such as tentacles, etc.).
- Muscle system.

In applying this scheme to the Helices, I have not attempted to use characters of the nervous system, partly because neither the requisite time or space is at my command, partly because other organs promised results of more immediate utility. The other organic systems named I have tried to study impartially. Although the foundation of this system throughout rests upon comparative anatomy, I have been influenced in some cases, where anatomical data are wanting or insufficient, by the facts of geographical distribution; but this class of facts I have purposely held subordinate to anatom-

ical affinities, even when as in the case of *Pleurodonte* (p. 86), I could not at the time of writing, see the slightest connection between the clearly expressed organic characters, and the apparently anomalous distribution.

CLASSIFICATION OF SNAILS WITH JAW AND A HELICOID OR ZONITOID SHELL.

Key to families.

[It will readily be understood that for purposes of a key, only the most obvious peculiarities are chosen; too much space would be required were the diagnostic characters of all organs to be given].

- I. Foot-edges with no trace of pedal grooves; no tail gland; sole undivided. Side teeth unicuspid, thorn-shaped, with narrow basal-plates. Shell with simple lip and without opaque markings, SELENITIDÆ.
- II. Foot margin defined by a pedal groove. Shell sharp-lipped.
 - a. Marginal teeth with narrow, elongated basal-plates, and either unicuspid and thorn-shaped by suppression of side cusps, or bicuspid by elevation of outer on middle cusp. Tail gland often present, and sole frequently tripartite, ZONITIDÆ.
 - b. Marginal teeth with wide, short and squarish basal-plates, with one or several cusps, the outer cusp never elevated on middle cusp. Shell with opaque, brown coloring or flammules, usually rib-striate, the lip thin, unexpanded and sharp, ENDODONTIDÆ.
- III. Foot-edges without pedal grooves; no tail gland. Marginal teeth with wide, short, squarish basal-plates and one or several cusps, the outer cusp never elevated on middle cusp. Shell usually with expanded or reflexed lip, HELICIDÆ.

This series of families is allied on one side to groups which have undergone degeneration of the jaw, such on *Rhytididæ*, and on the other to the families to be monographed in succeeding volumes of the *MANUAL*. The *Selenitidæ* and *Zonitidæ* will not further be considered in this volume, with the exception of a single genus of the latter (*TROCHOMORPHA*, page 1), which Tryon and Fischer erroneously intercalated among the Patuloid snails.

Synopsis of genera of Endodontidæ.

Endodontidæ	{	Polyplacognatha	{	<i>Punctum</i> , p. 6.
			{	<i>Laoma</i> , p. 8.
			{	<i>Flammulina</i> , p. 10.
			{	<i>Phasis</i> , p. 36.
	{	Haplogona	{	<i>Amphidoza</i> , p. 39.
			{	<i>Endodonta</i> , p. 20.
			{	<i>Pyramidula</i> , p. 42.
			{	<i>Pararhytida</i> , p. 52.



Synopsis of genera of Helicidæ.

Protogona	{	Jaw ribbed N. American	{	Penis retractor trifold, <i>Praticolella</i> , p. 67. P. retr. simple { lip well reflexed, <i>Polygyra</i> , p. 68. lip unexpanded, <i>Polygyrella</i> , p. 78.
	{	Anat. unknown, S. Amer. Papua. Shell many-whorled.	{	whorls rounded, S. American, <i>Polygyratia</i> , p. 81. whorls keeled, Papuan, <i>Coxia</i> , p. 83.
	{	Jaw smooth, S. African,	{	<i>Dorcasia</i> , p. 172.

Macro- ogona	{	No blind sack on vagina	{	Eggs or young very large { Keeled, emb. whorls decussate, columella short, with convex lobe or tooth, <i>Stylodonta</i> , p. 149. Not keeled, columella concave, lip narrow, <i>Helicophanta</i> , p. 151. Not keeled, lip very wide, colored, <i>Acazus</i> , p. 153. Eggs of moderate size { Keeled; lip and columella wide, colored, <i>Pyrochilus</i> , p. 154. Columella narrow, lip not bright, <i>Ampelita</i> , p. 155.
	{	A blind sack on vag. or sp. duct.	{	Shell Helicoid { Quoit-shaped, yellow, finely striate, <i>Macrocyclus</i> , p. 165. Quoit-shaped, dark and solid, <i>Pedinogyra</i> , p. 158. Subtrochiform, rough above, smooth below, <i>Anoglypta</i> , p. 159. Shell Bulimoid { Apex spirally lirate, suture crenulate, <i>Caryodes</i> , p. 161. Apex beaded or smoothish, suture even, <i>Panda</i> , p. 163.

Teleophallogona	{	<i>Thysanophora</i> , p. 54.
		<i>Sagda</i> , p. 58.
		<i>Zaphysemia</i> , p. 65.

- Epiphallogona { American; retractor apical on penis *Pleurodonte*, p. 84
 { emb. shell { *Camaena*, p. 101.
 { rather large { *Obba*, p. 107.
 { Old World; retractor on epiphallus { *Chloritis*, p. 117.
 { emb. shell minute { *Albersia*, p. 124.
 { *Thersites*, p. 125.
 { *Planispiru*, p. 110.
 { *Papuina*, p. 136.
 { *Ganesella*, p. 168.
- Belogona { American { Jaw smooth { Median teeth unicuspid, *Cepolis*, p. 177.
 { All teeth tricuspid, *Polymita*, p. 187.
 { Jaw ribbed { lip wide { tail with serrate keel { *Lysinoe*, p. 191.
 { *Oxychona*, p. 189.
 { lip simple, thin and sharp, *Glyptostoma*, p. 192.
 { tail smooth above, *Epiphragmophora*, p. 193.
 { lip wide { tail smooth above, *Epiphragmophora*, p. 193.
 { lip simple, thin and sharp, *Glyptostoma*, p. 192.
 { mucus gl. globular, *Helicostyla*, p. 216.
 { mucus gl. acicular, *Chloraea*, p. 214.
 { mucus gl. sacculated, *Eulota*, p. 200.
 { Eur-asian { Dart sack present { minute; anatomy unknown { *Aulacospira*, p. 279.
 { *Pupisoma*, p. 52.
 { No dart sack, shell white, chalky, *Lencochrca*, p. 232.
- Belogona siphonadenia. { Right eye-retractor passing to left of genitalia { *Geomitra*, p. 238.
 { *Helicella*, p. 245.
 { shell minute, depressed, mouth round, *Vallonia*, p. 282.
 { shell minute, elevated, ribbed, *Acanthinula*, p. 280.
 { shell opaque with well reflexed lip, *Helicodonta*, p. 284.
 { lip expanded, shell thin, sub-translucent *Hygromia*, p. 269.
 { Eye-retractor passing between branches of genitalia. { Jaw finely ribbed shell unicolored or one banded; no diverticulum { Jaw smooth, teeth unicuspid; 5-banded, *Allognathus*, p. 290.
 { Eocene-Miocene fossil forms { *Fridolinia*, p. 294.
 { *Dentellocaracolum*, p. 294.
 { *Cyrtochilus*, p. 311.
 { Jaw with flat, converging ribs, *Leptaxis*, p. 291.
 { Jaw coarse ribbed { dart 2-bladed; divert. attached to uterus, *Helicigona*, p. 296.
 { dart 4-bladed; diverticulum free, *Helix*, p. 311.
- Genera of doubtful affinities { *Plectopylis*, p. 143 (+ *Traumatophora* and *Stegodera*).
 { *Corilla*, p. 147.
 { *Chalepotaxis*, p. 167.
 { *Solaropsis*, p. 166.

B. Siphonadenia.

Macroögonia.

Pr otogona.

Belogona Euadenia.

Epiphallologona.

Teleophallologona.

?

*Phylogenetic diagram of the groups of Helices.**Key to genera of Endodontidae.*

[Family synonyms are *Charopidae* Hutton, *Phenacoheliciidae* Suter, *Patulidae* Mlldff., *Punctidae* Gill; all proposed for groups of less extent than the present family].

1. Jaw composed of numerous squarish plates connected by membrane only; side teeth all bicuspid. Shell minute.

a. Shell depressed, Hyalina- or Patula-like, unicolored, with round periphery *Punctum*, p. 6.

aa. Shell somewhat trochiform, keeled, at least in young, usually flame-painted *Laoma*, p. 8.

2. Jaw formed of overlapping laminæ partially soldered together, or solid and vertically striated.

a. Tail with a mucus gland *Flammulina*, p. 10.

aa. Mucus gland?

b. South African forms *Phasis*, p. 36.

bb. South American forms *Amphidoxa*, p. 39.

aaa. No mucus gland at tail.

b. Holarctic forms *Pyramidula*, p. 42.

bb. E. Indian, Australian and Oceanic forms *Endodonta*, p. 20.

3. Jaw solid and smooth; penis with flagellum (?) and appendix; shell moderately large, solid and strong. *Pararhytida* p. 52.

The genera of this group rest upon much slighter characters than those of *Helicidæ*. *Flammulina*, *Phasis* and *Amphidoxa* are separated mainly upon their geographic distribution, and many prove to constitute but one genus. *Endodonta* and *Pyramidula* are retained distinct for the same reason. The genitalia of very few of the southern hemisphere forms are known, and the jaws and teeth are not especially characteristic.

Key to genera of *Helicidæ*.

The author has purposely abstained from assigning subfamily rank to the natural tribes of *Helices* defined below. If they be considered subfamilies, they may bear the names 1 Polygyrinæ; 2 Acavinæ; 3 Sagdinæ; 4 Camæninæ; 5 Helicinæ.

I. Genitalia simple; vas deferens inserted directly on the well-developed, long penis, which has no epiphallus or flagellum; no dart sack or mucus glands; no diverticulum on spermatheca duct; eggs small and numerous. Jaw solid, ribbed or smooth; marginal teeth with more than one cusp. Shell with lip thickened within, expanded or reflexed, the embryonic whorls not distinctly differentiated

PROTOGONA.

II. Genitalia simple, the vas deferens inserted directly on penis or enlarged into an epiphallus; no flagellum. No dart sack or mucus glands, but sometimes having a blind sack or appendicula high on vagina; eggs or young at birth very large, hard-shelled. Jaw solid, smooth or vertically striate; teeth all unicuspid; embryonic shell large, generally distinctly differentiated from later growth by diverse sculpture or a terminal wrinkle. Shell large and solid

MACROGONA.

III. Genital system having an epiphallus and flagellum developed on penis, and a complicated, flagellum-like appendix, or penis gland; female side without dart sack or other accessory appendages; eggs calcareous-shelled, or young born alive. Jaw smooth or plaited; rhachidian teeth tricuspid, laterals bicuspid.

Tail with a longitudinal groove above. Shell somewhat Zonitoid, unicolorous, with sharp simple lip, neither thickened or reflexed

TELEOPHALLOGONA.

- IV. Genital system having an epiphallus and flagellum on penis (but these structures obsolete in some Pleurodotes and Planispiras); appendix or penis gland small if present; female side with no accessory appendages. Eggs small or moderate in size. Jaw smooth or ribbed; radula with two or more cusps on part of the side teeth. Shell usually solid, the lip expanded or reflexed

EPIPHALLOGONA.

- V. Genital system having epiphallus and flagellum (rarely wanting) on penis; a dart sack and mucus glands (rarely wanting) on vagina, and frequently a diverticulum on the long spermatheca duct. Eggs of small size. Jaw ribbed, smooth or plaited; teeth with several cusps on marginals (except in *Allognathus*). Shell solid or thin, often conspicuously banded

BELOGONA.

Some few exceptions to the above scheme are due to degenerative groups of the higher tribes, which simulate lower tribes, and are only to be correctly placed by attention to the totality of their characters. Of this sort are *Cristigibba*, which by degeneration of penis and its appendages is like the *Haplogona*; and *Ciliella*, *Metafruticicola* and *Cochlicella*, unquestionably *Belogona*, by the loss of their dart apparatus resemble *Epiphallogona*.

Tribe I, PROTOGONA.

- a. Jaw ribbed. North American forms.

- b. Penis retractor with trifid insertion; a large accessory sack on penis; shell globose, unkeeled, white with translucent or brown bands, lip narrowly reflexed

Praticolella, p. 67.

- bb. Penis retractor not split; no large sack on penis; shell yellowish or brown.

- c. Lip well reflexed, often toothed, but no internal teeth; striate above; spermatheca duct short

Polygyra, p. 68.

- cc. Lip not in the least reflexed, but thickened within; texture glassy; spermatheca duct long

Polygyrella, p. 78.

- aa. Jaw and soft anatomy unknown; shell discoidal, with many narrow whorls.

- b.* Whorls rounded at periphery; South American
Polygyratia, p. 81.
- bb.* Whorls carinated at periphery; Papuan region
Coxia, p. 83.
- aaa.* Jaw solid, smooth; penis sack continued slightly beyond
insertion of vas deferens; duct of spermatheca long; shell
globular or depressed-globose; S. African, *Dorcasia*, p. 172.

Tribe II, MACROGONA.

- a.* No blind sack or appendicula on vagina or spermatheca duct.
Eggs or young at birth very large, about one-third the
diameter of adult shell; shell with more less reflexed lip, the
embryonic whorls distinctly demarked from after growth.
 - b.* Shell keeled, at least when young, imperforate,
finely wrinkled, the embryonic $3\frac{1}{2}$ whorls spirally
grooved or decussate; columella short, vertical, its
inner edge with a convex lobe or acute fold. Vivi-
parous, Seychelles Is. *Stylodonta*, p. 149.
 - bb.* Shell capacious, not keeled; embryonic whorls
over one-third diameter of adult, post-embryonic
growth $1\frac{1}{2}$ whorls or less. Aperture large, lip nar-
row, dilated at columellar insertion; columella
concave, toothless. Madagascar
Helicophanta, p. 151.
 - bbb.* Shell imperforate, globose-depressed or trochoidal,
not carinated, solid, bright colored; embryonic
shell about $\frac{1}{2}$ diameter of adult. Lip broadly
reflexed, vividly colored *Acavus*, p. 153.
- aa.* No blind sack on vagina or spermatheca duct; junction of
nuclear shell with after growth not distinct; lip expanded or
reflexed.
 - b.* Shell acutely keeled, at least when young; lip
usually bright colored, the columella widened into
a flat plate. Moluccas *Pyrochilus*, p. 154.
 - bb.* Shell umbilicate (except in *Pæcilostylus*), the lip
not bright colored, not widened at columella.
Madagascar *Ampelita*, p. 155.
- aaa.* Vagina or spermatheca duct bearing a blind sack. Lip of
shell narrow or simple. Eggs and embryonic shell smaller.
 - b.* Shell Helicoid, umbilicate, wider than high.

- c. Shell solid, dark colored, quoit-shaped with wide umbilicus, flattened spire and subhorizontal, oblong mouth, the lip blunt, subexpanded, rounded; vagina with appendicula; jaw smooth. Australian, *Pedinogyra*, p. 158.
- cc. Shell subtrochiform, conoidal and tuberculate-lirate above, polished and one-banded below the peripheral keel; outer lip with a deflexed angle; spermatheca duct with a sack; jaw striate. Tasmanian *Anoglypta*, p. 159.
- bb. Shell bulimoid, higher than wide; outer lip neither expanded or reflexed.
 - c. Upper whorls spirally lirate, with crenulated suture. Tasmanian *Caryodes*, p. 161.
 - cc. Upper whorls finely beaded or smoothish, suture even. Australian *Panda*, p. 163.
- aaaa. Soft anatomy unknown; teeth all unicuspid; shell quoit-shaped, with wide umbilicus and low spire, uniform yellowish, densely striate; lip narrowly expanded throughout. S. America *Macrocyclus*, p. 165.

Tribe III, TELEOPHALLOGONA.

- a. Shell smooth, depressed or trochoidal, light yellowish, having the texture of *Hyalina*, composed of 6-9 narrow, closely coiled whorls. Aperture small, narrowly lunate, often with internal laminæ, the lip thin, sharp and simple *Sagda*, p. 58.
- aa. Shell globose, imperforate, of 5-6 convex whorls, the last large, inflated, brown; aperture large, rounded-lunate, toothless, the lip thin and sharp, closely appressed at the white-calloused columella *Zaphysema*, p. 65.
- aaa. Shell conic or depressed, thin, not opaque, pale brownish or corneous, umbilicate; surface rather dull, often bristly or with delicate riblets; whorls 4-6½, separated by deep sutures. Aperture round-lunate or oblong, toothless; lip thin, often a trifle expanded *Thysanophora*, p. 54.

Tribe IV, EPIPHALLOGONA.

- a. Epiphallus developed, flagellum usually present, but short.
 - b. Penis retractor inserted at apex of penis; American *Pleurodonte*, p. 84.

- bb. Penis retractor inserted on epiphallus ; Old World.
- c. Penis with a feather-shaped appendix ; jaw smooth *Obba*, p. 107.
- cc. No such appendix.
 - d. Apex or whole shell with points in quincunx ; jaw ribbed *Chloritis*, p. 117.
 - dd. Genitalia unknown ; jaw ribbed ; shell imperforate, with columella wide above *Albersia*, p. 124.
 - ddd. Not so sculptured.
 - e. Solid, capacious, rough sculptured ; embryonic shell rather large *Camæna*, p. 101.
 - ee. Rather solid, depressed, depressed-globose or keeled *Thersites*, p. 125 ; *Planispira*, p. 110.
 - eee. Trochoidal, thinner and mostly light colored *Papuina*, p. 136 ; *Ganesella*, p. 168.
- aa. Epiphallus or flagellum more or less obsolete.
 - b. Epiphallus more or less obsolete, flagellum present *Polydontes*, etc., p. 87.
 - bb. Epiphallus and flagellum obsolete *Cristigibba*, p. 112.

Tribe V, BELOGONA.

- a. Mucus glands sacculated, club-shaped, bulbous or flattened, glandular, inserted on dartsack or at its base, never on vagina above dart sack (except in *Lysinoe*, p. 191, in which there are 3 club-shaped glands on vag.) *Belogona Euadenia*, p. 175.
- aa. Mucus glands tubular or finger-like (except in *Elona*, p. 307), and always inserted on vagina, never on dart sack or accessory sacks *Belogona Siphonadenia*, p. 235.

KEY TO GENERA BY SHELL CHARACTERS.

A key to groups of Helices based upon shell features only, cannot be made without numerous double entries, and even then to be exhaustive it would be extremely complicated, probably too complex to be of use to beginners in the science, for whom alone it

would be intended. The following table simply shows the genera arranged according to some of the more obvious shell characters.

I. Shell with lip thin and sharp, as in *Zonites*, not expanded, reflexed or with a rib-like thickening within.

1, American: *a*, no internal teeth or laminae: *Pyramidula* 42, *Punctum* 6, *Amphidoxa* 39, *Hyalosagda* 61, *Thysanophora* 54, *Zaphysema* 65, *Glyptostoma* 192, *Polymita* 184.

b, with internal teeth or laminae: *Helicodiscus* 51, *Sagda* 58.

2, Old World: *a*, no internal laminae or teeth: *Pyramidula*, *Punctum* 6, *Phrixognathus* 9, *Flammulina* 10, *Phasis* 36, *Charopa* 22, *Pararhytida* 52, *Anoglypta* 159, *Caryodes* 161, *Panda* 163, *Pupisoma* 52, *Acanthinula*, *Chalepotaxis* 167.

b, with internal laminae or teeth: *Atlantica* 50, *Laoma* 8, *Endodonta* 20.

II. Shell with lip blunt, hardly or not at all expanded, usually thickened within.

1, American: *Polygyrella* 78, *Polymita* 184.

2, Old World: *Pedinogyra* 158, *Leucochroa* 232, *Helicella* 245, *Geomitra* 238, *Hygromia* 269, *Acanthinula* 280.

III. Shell with lip expanded, not flatly reflexed.

1, American: *Praticolella* 67, *Polygyratia* 81, *Macrocyclus* 165, *Thysanophora* 54, *Pleurodonte* 84, *Cepolis* 177, *Lysinoe* 191, *Epiphragmophora* 193, *Oxychona* 189, *Vallonia* 282, *Solaropsis* 166.

2, Old World: *Coxia* 83, *Dorcasia* 172, *Stylodonta* 149, *Helicophanta* 151, *Ampelita* 155, *Camæna* 101, *Obba* 107, *Chloritis* 117, *Albersia* 124, *Thersites* 125, *Planispira* 110, *Papuina* 136, *Ganesella* 168, and most genera of *Belogona*.

IV. Shell with the lip decidedly reflexed, often toothed.

1, American: *Polygyra* 68, *Vallonia* 282, *Pleurodonte* 84, *Lysinoe* 191.

2, Old World: *Acavus* 153, *Pyrochilus* 154, *Camæna* 101, *Obba* 107, *Chloritis* 117, *Thersites* 125, *Planispira* 110, *Papuina* 136, *Helicostyla* 216, *Chloræa*

214, Eulota 200, Vallonia 282, Helicodonta
284, Helicigona 296, Helix 311, Plectopylis
143, Corilla 147.

IV. DISTRIBUTION OF HELICES IN TIME AND SPACE.

The bare facts of distribution of the several genera and species are sufficiently stated in the systematic portion of this work; it remains to draw the more obvious conclusions which they indicate. As to *means of distribution*, there is much reason to believe that upon continental areas, land snails, like mammals, have been mainly dependant upon their own powers of locomotion, although rivers with their flood-carried debris have doubtless been effective. Such island faunas as are not traceable to former land connections, are probably due to drift wood and "floating islands" swept from rivers; for although in rare cases the agency of birds or cyclones may have been efficient, still the evidence of such means of transport of land snails is extremely slight, and the facts now known do not warrant or call for any extensive invocation of means so extraordinary and exceptional, and so completely hypothetical. It will readily be understood that the case with freshwater snails is quite a different subject.

The key to the wide distribution of many genera or super-generic groups of terrestrials, is the known fact of their vast antiquity, which has enabled them to take advantage of the various land combinations of several geological periods, and also of the rarely occurring means of transport mentioned above.

The fact must constantly be borne in mind that the evolution of Pulmonates has been excessively slow; and although the terrestrial forms have changed more rapidly than the freshwater mollusks, they cannot be compared with mammals or birds in this respect. Many genera of Helices dominant to-day, are known to have existed in the early Miocene, and apparently as distinct then as now. In the Eocene, forms less close to the recent occur, but in many cases they cannot be generically different. In the mammalia we find the roots not only of families, but of *orders* in Eocene strata, while even the *genera* of Helices have scarcely changed since that time. The super-generic groups must, therefore, strike deep into Mesozoic time. As the means of transport of land snails are very limited and slow, they lag far behind such freely mobile creatures as mammals and birds; and, therefore, we do not find, nor can we expect to

find that the life areas defined by mollusks and those based on the vertebrates named, correspond in all respects; although the much greater time limit in the case of mollusks to some extent offsets their slower movements. The same factor of greater antiquity introduces another disturbing quantity into the equation; for land mollusks have been able to take advantage of early continental and insular connections which no longer existed when the modern orders of placental mammals came upon the stage.

In the following pages, the distribution of the *Helices* will be discussed in order of groups. It will readily be understood that the hypotheses offered, whether borrowed or original, are simply suggestions, subject to such changes as the study of other groups or of palæontology demands, or to complete rejection. They are based, however, on a careful consideration of the facts now known, with regard to land snails generally; and are, I trust, fair inferences from these facts.

Endodontidæ. As will be seen in the systematic part of this work, this family is intermediate between *Zonitidæ* and *Helicidæ* in its characters, and it is decidedly less specialized than either. While it may not be in the direct line of descent of these two families, it is certainly nearer than either of the others to the common ancestor of the three, as is shown by its unspecialized jaw, teeth, genitalia and shell. Palæontology has yet given but little to the history of the group, but that little is significant; the Carboniferous of Nova Scotia has afforded a small Helicoid described as *Zonites priscus* Cpr., which in form and ribbed-striate sculpture can only be compared to such *Endodontidæ* as *Pyramidula* or *Charopa*. In my opinion this species is to be regarded as the oldest form of Helicoid yet known, and as a probable member of the genus *Pyramidula*.

Agreeing with this view of the antiquity of the group is the fact that the *Endodontidæ* have a wider geographic range now than either *Helicidæ* or *Zonitidæ*, inhabiting the entire Holarctic realm, the southern extremities of S. America and Africa, Australo-Zealandic land, and almost all oceanic islands of the entire globe. Upon the continents they are very scarce or absent in the tropics, probably from the competition of numerous newer groups; and it is mainly in island faunas, where they do not compete with true *Helicidæ*, that snails of this family abound. The presence of very similar forms in southern South America and Tasmania and New Zealand, has been accounted for by the hypothesis of a former more

extensive Austral continent or "Antarctica," which may have been supplied with these snails as well as with certain marsupials, fishes, etc., from Australia, and subsequently became united at Cape Horn, transferring the fauna. The connection could hardly have been in a reverse order, or why should not Edentates and Hystricomorph Rodents have invaded Australia? The principal papers bearing on such continental connections in relation to mollusks are those of Hutton, von Ihering and Hedley. It is obvious that the *Endodontidæ* and *Helicidæ* alone are insufficient to base much speculation upon regarding former extensions of Austral land. A similar question occurs with regard to the fauna of South Africa, which in the presence of *Endodontidæ*, *Rhytididæ*, *Celiaxis*, etc., shows affinity to that of New Caledonia, Australia and Tasmania. The flora, according to Hooker, also has affinities with the West Australian.

Helicidæ-Protogona. This group, as the name implies, is believed to be nearer the ancestral stock of the family than the other groups, mainly because of the simplicity of the genitalia, which are as in *Endodontidæ*, the less modified *Zonitidæ*, the *Rhytididæ*, etc. The palæontological history of the group is very scant, a few species entirely modern in aspect being found in Miocene strata of Florida. Some forms of equal or greater age are reported from the western United States, but none of them are really known to belong to this group. The references to *Triodopsis* and *Mesodon* by writers on the European Tertiary are groundless, the supposed *Triodopsis* belonging to *Isognomostoma*, the *Mesodons* to *Mesodontopsis*, a group near *Tacheocampylæa*.

Of the living forms, *Polygyra*, *Polygyrella* and *Praticolella* are exclusively North American, the first named having a few species in the West Indies, and a few which have penetrated from the head valleys of the Missouri to those of the Columbia, and thus reached the northwest coast, the others being East American. There cannot be much doubt that the ancestors of this group of genera have occupied East American soil ever since it had a fauna of *Helicidæ*, and with the *Pyramidulas*, to the exclusion of other groups of Helices. In South America the genus *Polygyratia* occurs; and while it is likely that its affinities and past history are similar to the preceding North American forms, no safe conclusions can be drawn until the anatomy is known. The species from New Guinea and New Ireland, grouped under *Coxia*, are also beyond the limit of profitable speculation.

The South African genus *Dorcasia*, although so widely separated geographically, seems to be a member of this group of genera. It is probably a remnant of a large number of *Protogona* which may have had a wide range in the Eastern Hemisphere in Mesozoic times.

Macroögonia. This group comprises all the large Helices, in fact all the *Helicidæ* of Madagascar and the Seychelles, with genera in Ceylon and Moluccas, and another group of genera in eastern Australia and Tasmania (see page 148). No profitable speculations can now be based upon this peculiar range, which probably dates from Mesozoic time. The largest known Helices belong to this group, as well as some very handsome forms, such as *Acavus hæmatorum* and *Pyrochilus lampas*, described in the last century. As a temporary expedient, we have placed the N. Chilian group *Macrocyclus* here, but it may prove to belong elsewhere, possibly to *Protogona*, when the genitalia come to be examined.

Teleophallogona. As stated on p. 56, this group, consisting of three genera only, is essentially West Indian. *Zephysema* is restricted to Jamaica; *Sagda* is nearly as local, although a few species from Hayti and Cuba are referred here; while *Thysanophora* is universally diffused throughout the West Indies, and occurs on the mainland from Trinidad to Florida.

Epiphallologona. The range of this group of genera includes Australia (but not Tasmania), the Solomon Islands (but neither New Caledonia or New Zealand), New Guinea north throughout the East Indies, and the mainland of Asia from India to Japan. In America it covers the West Indies and northern South America. The majority of genera and species are insular.

Arising from an Oriental Protogonous stock now extinct, probably a remnant of the same which had much earlier given birth to the *Macroögonia*, this tribe seems to have radiated in all directions. There is no evidence showing that it ever extended further west than at present; but in the north it evidently passed over a Bering bridge, and travelled southward in America, becoming established in the West Indies, probably in Secondary times. In this invasion of American soil, the ancestors of the West Indian and Mexican genera of *Cyclostomatidæ* and *Cyclophoridæ* probably shared, the nearest allies of these groups being Oriental forms.

Whether the American Clausilias accompanied this early exodus, or a later one, remains uncertain; and the same is true of the

Glundinidæ and *Streptaridæ*, which, indeed, may have originated in America. On the south and south-east, the Oriental area of Epiphallogona overlaps somewhat that of the much older Austral fauna of *Endodontidæ*, *Rhytididæ* etc., which lies mainly south and east of the range of the other group. Similarly, the Epiphallogona extend southward far beyond the range of the Belogona. The succession of these faunas from south to north in this Asio-Australian belt of islands, is extremely significant, and clearly indicates the comparative ages of the groups in that region. *The chronological order of appearance of Endodontidæ, Macroögonæ, Epiphallogona and Belogona, as determined by theoretical grounds from their comparative anatomy, coincides with the evidence given by their geographic distribution.*

Belogona. By comparing the organs of such an Epiphallogonous form as *Chloritis* (pl. 28, figs. 1-4) with some Asiatic or American Belogona, such as *Monadenia*, pl. 59, figs. 81, 86, or *Mastigeulota*, pl. 66, fig. 26, it will be noticed at once that the structure of the male genitalia is identical in the two groups; each having a short penis continued in an epiphallus which bears the retractor and ends in a flagellum. The female side is alike in the two groups in having the spermatheca duct long and branchless, the other organs being identical except that in the Belogonous groups *the dart apparatus is added.* The jaw, teeth and shell show no features diagnostic of the groups Epiphallogona and Belogona. It is, therefore, highly probable that the latter group originated from the former, merely adding the dart apparatus to the characters already possessed by the parent stock. There is no especial reason for believing that this transformation took place in any other area than that now occupied by the most nearly allied modern forms of each of these groups, viz. southeastern Asia or the adjacent island groups. The evidence derived from comparative anatomy tends to show that the dart apparatus of the Helices was evolved *de novo* in this group, and while analogous to that of the *Zonitidæ*, it is not homologous. As in *Zonitidæ*, the glands associated with the dart sack were originally proliferations from that sack; and this structure is still retained in the Oriental and American genera constituting the BELOGONA EUADENIA. In the European group of genera the glands have moved from the dart sack to the vagina, and are generally found inserted above, never below, the insertion of the dart sack. This is a purely secondary change, and together with the modification of

the glands into the tubular or finger-like form, is characteristic of the *BELOGONA SIPHONADENIA*.

The *Belogona Euadenia* in the Old World extend from Japan and India southward throughout the East Indies, with a few *Corasia*-like forms in New Guinea and the Solomons. That they are chronologically a later element than the *Epiphallogona* is shown by the fact that they are represented in the southern and southeastern portion of this range by only one genus (*Helicostyla*), and even this is much restricted, being absent in Australia, the Louisiades and New Hebrides, etc., where *Epiphallogona* are well represented. On the north, the mainland of Asia offered easy passage to Japan; and during a period of mild climate in high latitudes, and of elevation of the Bering Sea region, the *Euadenia* penetrated westward to America and south east to California, Mexico and South America, crossing to the West Indies by way perhaps of a Yucatan-Cuba ridge of elevation.

The date of this exodus of Asiatic life we are unable now to fix; but it could hardly have been later than the beginning of the Eocene, and there are good reasons for believing it earlier. At the same time, while it may have been coincident with the ingress of *Epiphallogona* into America, it was probably later; for no *Belogona* reached the Caribbean chain (where a well differentiated group of the other tribe is universally represented), and its distribution eastward in South America is less great. In North America the barrier to eastward distribution has apparently been due to extensive inland seas in the Rocky Mountain tract, and upon their disappearance to arid climatic conditions. At all events, we now have in America several sharply defined generic types: *Cepolis*, the peculiarities of which have been evolved on Antillean soil, and which gave rise to a side line of arboreal snails, *Polymita*, the early origin of which is shown by its retention of three cusps on all teeth; a feature now lost in the other genus, some divisions of which have also assumed arboreal life, with its consequent remodelling of the radula. On the mainland the Mexican genus *Lysinoe* offers characters clearly telling of ancient divergence; and this is supported by the discovery of a species apparently allied to *L. ghiesbreghtii* in the Puerco Group of New Mexico, this Eocene horizon being below the Wasatch Group, immediately above the Laramie (*H. nacimientensis* White, Bull. U. S. Geol. Surv. no. 34, 1886, pl. 5, f. 3-7). Associated with this *Lysinoe* in the Puerco are *Holospira* and numerous fresh-water forms.

Several Eocene species from Utah and Wyoming are probably referable to *Epiphragmophora*; and perhaps the Miocene *Helix leidy* Hall & Meek belongs here also; though the condition of preservation of these fossils of the fresh-water strata of the West, is quite insufficient for positive generic identification, which must await the finding of more perfect material.

Returning to the Palearctic region, we observe that a few species of *Eulota* have penetrated into Central Asia, and one, *E. fruticum*, as far as eastern Europe. This form is evidently a late-comer, being absent from the loess fauna, and belonging to a section of *Eulota* characterized by the degeneration and loss of the flagellum. Its late advent in Europe may be correlated with the presence in China of a few European types such as *Helicodonta* and *Metodontia*.

The *Belogona Siphonadenia* are *par excellence* the Helices of Europe. Judging purely by the present distribution of the group, its diagnostic peculiarities seem to have been assumed in the European or adjacent tracts, whither the ancestral stock of *Belogona Euadenia* had emigrated from the Orient. Probable companions of these *Belogona* were the terrestrial operculates (some of which have been erroneously referred to West Indian genera), and perhaps the Agnatha, although the origin of these is problematic. In this European extension of the Palearctic fauna the Siphonadenious phylum has split into numerous genera, and apparently has crowded out any earlier Helices of simpler structure, if such ever existed in that quarter of the world. The old families *Eudodontidae* and *Zonitidae* retained their place owing probably to the notably different stations occupied by them. Very early branches of the European *Belogona* were *Leucochroa*, a probable remnant of the original stock which did not share the changes resulting in modern *Siphonadenia*; and *Vallonia*, a genus well differentiated in the early Eocene of Europe, now more widely dispersed than any other genus of *Helicidae*, and possibly antedating the European immigration. Further notes upon the *Belogona Siphonadenia* will be found on pages 235-237. The only Siphonadenia which have strayed far from the area now occupied by the majority of the genera, are certain Chinese forms referred to *Helicodonta* and *Hygromia* (*q. v.*), which from their close resemblance to European types are probably recent colonies moving eastward through Siberia. Thus, *Metodontia* seems closely allied to *Dibothrion*, a group of middle Europe and Siberia; and *H. biconvexa* of China is nearly allied to the European Miocene *H. involuta*

as the Chinese *H. binodata* is to certain living and tertiary European species.

* * *

Summary by Continents. The Americas are poor in autochthonous types of Helices (and land snails generally), the genera *Polygyratia*, *Solaropsis* and *Macrocyclus* being the only South American forms of great antiquity, the genera *Epiphragmophora*, *Pleurodonte* and probably *Oxychona* having been derived from the north in comparatively recent times, and the *Amphidoza* forms are in all probability stragglers from the Australian tract.

The West Indies claim one group of genera, *Sagda*, *Thysanophora* and *Zaphysema* of evidently great age and unknown ultimate affinities, but the other elements, *Pleurodonte*, *Cepolis* and *Polymita* are Mesozoic or early Eocene immigrants from the mainland, and primarily from Asia.

North America possesses in *Polygyra*, *Polygyrella* and *Praticol-ella* a primitive fauna, to which has been added from Asia, the belogonous forms *Vallonia*, and the stock now differentiated into *Epiphragmophora*, *Lysinoe*, *Glyptostoma* and the West Indian genera mentioned; this addition can scarcely have been later than Cretaceous or base of the Eocene.

Africa is in the north practically a part of Europe; but at the Cape a *Helix*-fauna of as primitive a type as that of eastern North America is found, consisting of the genus *Phasis* of *Endodontidae* and *Dorcasia*, a type allied to *Polygyra*, and probably a remnant of the early wider distribution of the *Protogona*. S. Africa has real affinities with Australia, but whether these are due to the preservation of antique types in both tracts, or to some actual connection, remains to be solved. Madagascar is much more allied to Ceylon and Australia than to S. Africa.

Europe and western Asia. The western portion of Asia together with Europe and North Africa, is peopled by a peculiar, highly organized type of Helices practically confined to these regions, but evidently derived ultimately from extreme south-east Asia or the East Indies, by a Cretaceous (?) migration.

Eastern Asia, from Japan and China southward to Australia, constitutes another great division in *Helix* distribution, and the middle of this area has been in all probability the birth-place of the groups *Epiphullogona*, *Belogona* and *Macroogona*. These three divisions still occupy the region, various genera of the first, *Camæna*, *Chloritis*,

Thersites, *Obba*, *Planispira*, *Papuina*, *Ganesella*, being characteristic of all portions of the tract. The *Belogona* have a smaller range southward, but in the genera *Helicostyla*, *Eulota* and their allies, extending over the central and northern portions of the region. The several genera of *Macroögonia*, such as *Helicophanta* and *Ampelita* in Madagascar, *Acavus* in Ceylon, *Panda*, *Pedinogyra*, *Anoglypta*, etc. in Australia and Tasmania, have a much broken, discontinuous range, indicating a high antiquity and much extinction; but the origin of the group from Protogonous ancestors, within the general region now covered by the several genera, is probable.

In conclusion: We find that the distribution of *Helices* in space and time is not hap-hazard or erratic, as has been supposed from the earlier classifications, and from the erroneous generic and subgeneric references contained in works on the fossil forms, but that it is orderly and comprehensible. We find that, whenever the data are sufficient for judgment, the genera and species of any given life-area exhibit such affinities to each other and to those of adjacent areas, that no orographic changes or continental extensions other than those recognized by geologists as either demonstrated or probable, are necessary to account for the various snail faunas of to-day. We find that not only is it unnecessary to throw land bridges across the depths of Atlantic and Pacific to account for the distribution of *Helices*, but that such hypotheses are contrary to many facts indicating that such groups of snails as are common to America and Europe, have radiated from an Oriental center westward to Europe and eastward *via* the Bering Sea route to America, while in the far south a hypothetical extension of the Antarctic continent fulfils the conditions asked by the zoögeographer. Another fact worthy of remembrance is that in each faunal region, one or a few types of *Helices* have been modified to fill the several stations available, and that the most highly modified forms are generally found to be nearest akin to the normal *Helices* of the same region, not to similarly modified *Helices* of other regions. Thus, the groups *Phengus*, *Papuina*, *Oxychona* and *Leptoloma* are strikingly similar, yet they are not related to each other, but to less abnormal snails occupying their several areas. The same is true of *Curacolus* and *Thersites*; *Camæna*, *Enhadra* and *Hadra*, *Stylodonta* and *Columpica*, *Isognomostoma* and *Triodopsis*, and scores of other groups.

V. PREPARATION OF LAND SNAILS FOR ANATOMICAL STUDY.

Land snails intended for anatomical examination should be placed when collected in a vessel of water from which air is excluded. Usually twenty-four hours is a sufficient time to drown the animal, when they may transferred to 50% alcohol and after a day to 60 and then 80%. It is often impossible on account of lack of facilities to observe this rule; and in such cases the animal may be thrown into about 60% alcohol when drowned. If time or facilities cannot be had for drowning the snails in water, they should be killed by the usual method, by scalding with boiling water, and then placed in spirit not stronger than 60%. *The one process to be avoided is plunging the living animal into spirit*; as this causes so much contraction that subsequent work is very difficult. Of course even a badly contracted specimen is vastly better than none; and no malacologist should neglect to preserve some sort of specimen of a species not known anatomically, in view of the present condition of malacology, and the advantage to be gained for science by the expenditure of the small amount of time involved in preserving the soft parts.

The dissection of land snails is very easy, a shallow vessel with a floor of blackened wax, some small scissors, a scalpel and pins being all the material required. After removing the shell and observing external features, an incision may be made extending from the top of the head backward, laying open the visceral mass. The genitalia will then be seen on the left (the head being toward the observer), the digestive tract in the middle. Each of these systems may be readily removed and pinned out separately for examination. Jaw and radula may be mounted in glycerine jelly in the usual manner.

NOTE ON NOMENCLATURE.

The numerous changes from previous usage in generic and subgeneric names of Helices, which have been introduced in this volume, are mainly due to a rigid adherence to the rule of priority. The older generic and subgeneric names were nearly all proposed for miscellaneous and artificial assemblages of species; and in these cases we are compelled to accept these names in the sense in which subsequent authors understood them and restricted them. For example: Férussac's *Helicigona* comprised all keeled and edentulous Helices; but as Risso retains under that name only the *H. lapicida* and *H. cornea*, we must accept this restriction; and as *cornea* was

not included by Férussac in his group, while *lapicida* was, we are obliged to consider the latter species the type of *Helicogona* Fér. Some authors demand that a generic name to be accepted, must be not only appropriate in meaning, but also be correctly limited by its describer; but such a course would only result in utter confusion. Thus, if correct limitation be insisted upon, we might have given new names to about half the genera as recognized herein, for fully that many are composed of materials never before brought into the present associations and groupings. Instead of such a course, we have invariably tried to select for each group, the oldest name applied to any of its members.

Regarding specific nomenclature, we believe that the dictum, "once a synonym, always a synonym," is the only satisfactory course. Thus, *Helix edwardsi* Cox was changed to *H. nigrilabris* because there was a prior *Helix edwardsi* of Bland; and this change holds, even though the shells of Cox and of Bland are now known to belong to different genera. On the other hand, *Polygyra hemphilli* W. G. B. is not held to be preoccupied by the earlier *Helix hemphilli* Newc., because Binney described his species as a *Tridopsis*, not a *Helix*; and as *hemphilli* W. G. B. is a *Polygyra*, and *hemphilli*, Newc. a *Pyramidula*, there has never been a duplication of the binomial term "*Helix hemphilli*."

Genus TROCHOMORPHA Albers, 1850.

Trochomorpha ALBERS, Die Heliceen, p. 116.—MARTENS, Die Hel. (edit. 2), p. 60, type *trochiformis* Fér.; Ostasiat. Zool., Land-schn. p. 245.—*Discus* ALBERS, l. c., p. 117.—MARTENS l. c., p. 61-type *metcalfei* Pfr. Not *Discus* Fitz., q. v.—*Nigritella* MARTENS, Die Hel. (edit. 2), p. 63, type *nigritella* Pfr.; Ostas. Landschn., p. 246.—*Videna* H. & A. ADAMS, Gen. Rec. Moll. ii, p. 115.—MARTENS, Ostas. Landschn., p. 247.—*Sivella* BLANFORD, Ann. and Mag. Nat. Hist. (3) xi, p. 86 (1863), type *castra* Bens.—*Geotrochus* v. HASSELT, Algemeene Konst- en Letterbode voor het Jaar 1823, p. 233 (= *Trochomorpha* sp. and *Sitala* sp.)

Shell varying from high trochiform to depressed lens-shaped, umbilicate or at least perforate; solid and opaque, or thin and subtranslucent; carinated, at least in the young. Having 5–6 whorls. Surface rather smooth. Embryonal whorl not marked off from the after growth. Aperture basal, the upper lip terminating at the keel or periphery; *peristome simple* and sharp, or thickened and blunt, the basal margin arcuate; *columnellar margin arcuate, short, not dilated or reflexed*; ends of lip distant. Type *T. trochiformis* Fér., pl. 7, figs. 8, 9. (See also pl. 7, figs. 1–3, *T. quadrasi* Hid.; pl. 7, figs. 4–6, *T. merzianoides* Grt.; pl. 7, fig. 7, *T. meleagris* Pfr.)

Animal: Foot long and rather narrow; sole flat, *with no trace of longitudinal division*; *parapodial groove distinct*, bounding a wide vertically grooved foot margin, and having a shallower groove above it. Tail depressed above, rounded behind, *without a mucus gland*. Back with several indistinct longitudinal rows of granules; sides irregularly granular. Shell lappets none; but mantle having a wide body-lappet on the right and a small one on the left. Lung orifice to the left of the superior angle of aperture. (pl. 8, fig. 12, *T. assimilis* Grt.; fig. 13, *T. beckiana* Pfr.; pl. 9, figs. 32, 33, *T. timorensis* Mts.).

Genitalia simple, the penis moderately long, somewhat twisted, the retractor muscle and vas deferens entering at the apex. Spermatheca on a short duct. (Pl. 8, fig. 9, *T. assimilis*; fig. 14, *T. beckiana*; fig. 17, *T. troilus*; fig. 19, *T. subtrochiformis*; figs. 15, 16, *T. metcalfei*; pl. 7, figs. 14, 15, *T. planorbis*). Orifice of genitalia near the pedal groove, below and slightly back of the right eye-peduncle. Right eye peduncle retracted between branches of genitalia. Kidney long and narrow.

In *T. castra* and *T. timorensis* (pl. 9, fig. 31) the duct of the spermatheca is very long. In all other features of genitalia, jaw and teeth, they resemble the typical Trochomorphas. The length of this duct may warrant the retention of the section *Sivella* Blauf.

Jaw arcuate, smooth, with a small median projection, or none. (Pl. 8, fig. 10, *T. assimilis*; pl. 7, fig. 13, *T. planorbis*; pl. 9, fig. 30, *T. timorensis*.)

Radula: *Central and lateral teeth having the strong mesocones projecting well over the posterior borders of their basal-plates, and lacking ecto- and entocones.* Outer lateral teeth at first sinuated outside, the sinuation increasing to a denticle on the transition teeth, and ascending on the mesocone to form the long bifid cusps of the marginal teeth, which become very oblique (pl. 8, fig. 11, *T. assimilis*, central, lateral and transition teeth, with several adjacent marginals and an outer marginal drawn). See also fig. 18, *T. subtrochiformis*, showing central and 1st, 12th, 13th and 24th teeth.

Of the names quoted in the reference paragraph above, none antedates *Trochomorpha* except v. Hasselt's *Geotrochus*, dating from 1823; but as the species included by the Dutch author were not described nor figured, and in fact remained unrecognized until v. Martens identified them by the aid of v. Hasselt's unpublished drawings, his names cannot have precedence for either genus or species.

The prominent features of this genus are its simply conical or lens-shaped, smooth shell, with toothless aperture and non-expanded lip; the undivided sole of the foot, bordered above by parapodial grooves, without caudal mucus gland; the simple genitalia; smooth jaw; and unicuspid central and lateral, and bifid, *Nanina*-like marginal teeth.

Our knowledge of the anatomy of this genus hitherto has been due to Semper's investigations. Gould has given figures of the living animal of *tentoriolum*, *troilus* and *coniformis*, and Quoy and Gaimard figure that of *solarium*. All of these figures agree with my own observations and figures of *T. assimilis* Grt., from which the above account is mainly drawn. Wiegmann has recently dissected a specimen of *T. planorbis* Less. (Webers' Zool. Ergebnisse einer Reise in Niederländisch Ost-Indien, iii, p. 152, 1893). This species shows the lower portion of the vas deferens to be dilated beyond the apex of the penis, where the retractor muscle is inserted (pl. 7, figs. 14, 15, showing penis, etc. from both sides). The vagina is much

swollen between the lower end of the uterus and the opening of the spermatheca duct, and at the upper end of this swollen portion there is inside a whitish gland formed of one-celled club-shaped follicles (pl. 7, fig. 14a). This internal vaginal gland has not been noticed in other species. Stoliczka has published the anatomy of *T. castra* and *T. timorensis* (Journ. As. Soc. Beng. xlii), finding these species to have the structure of typical Trochomorpha except for the very long duct of the spermatheca.

The genus *Trochomorpha* inhabits a vast area, and is excessively prolific in specific and varietal forms. Its range extends from India, central China and the Liu Kiu Is. on the north, southward to New Guinea, the Louisiades and New Hebrides, and east to the Society Islands. It is not known to occur in Australia, New Caledonia, or any island having the Australo-Zealandic fauna, such as Norfolk and Lord Howe. The species are in many cases founded upon slight differences, and may become subject to some reduction as our knowledge of their variation increases. For the present, it is necessary to use great care in their description; the width of umbilicus compared with that of the base should always be stated. The only genus with which species of *Trochomorpha* are likely to be confused is the East Asian group *Plectotropis*; this however differs in the dilated columellar lip of the shell, etc.

Subdivisions.

Trochomorpha may be divided into three sections: (1) TROCHOMORPHA s. str. (of which *Nigritella* is a synonym), containing the solid, opaque, trochiform species, mainly Polynesian, (2) VIDENA Ads. for depressed, acutely keeled, thin shelled forms, with wide umbilicus, and (3) SIVELLA Blanf. for species having the shell like *Videna*, but with a very long duct to the spermatheca.

The species of *Videna* occupy the entire area inhabited by the genus, but are especially characteristic of the Philippines and east Indies generally. *Sivella* is an Indo-Chinese group.

Systematic position.

The family relationships of *Trochomorpha* have been variously estimated; v. Martens (Albers, edit. 2) placing it under *Nanina* as a subgenus, while Pfeiffer (Nomencl. Hel. Viv.) considers it a genus between *Leucochroa* and *Patula*. Semper also places it among the true Helices. The facts at present known incline me to view

Trochomorpha as a somewhat aberrant genus of *Zonitidae*; and as such it can properly claim no place in this volume. *It is a significant fact, that, so far as I know, all Zonitidae which possess a bifid cusp upon the marginal teeth, form it by the elevation of the ectocone upon the mesocone, while in those Helicidae having a long bifid inner cusp on the marginals it is formed by the union of the entocone with the mesocone.* One of the earliest modifications of the Zonitid stock was the loss of entocones from the marginal teeth; but in the Helicoids they persist in most genera.

Species of India, China, Farther India and adjacent islands.

- | | |
|-------------------------------------|--------------------------------|
| T. benigna Pfr. iii, 84. | T. percompressa Bens. iii, 84. |
| T. borealis Mlldff. viii, 119, 133. | T. saigonensis Crse. iii, 84. |
| T. cantoriana Bens. iii, 83. | T. sapeca Heude. |
| T. caryx Bens. iii, 75. | T. shermani Pfr. iii, 84. |
| T. castra Bens. iii, 84. | T. subtricolor Mab. viii, 134. |
| v. galerus Bens. iii, 75. | T. timorensis Mts. iii, 83. |
| T. fritzei Bttg. viii, 194. | thieroti Morg. viii, 133. |
| T. haenseli Sch. & Bttg. viii, 119. | T. tonkinorum Mab. viii, 120. |
| T. paviei Morl. iii, 82. | |

Species of Andaman and Nicobar Is.

- | | |
|-------------------------------|-----------------------------------|
| T. billeana Mörch. iii, 84. | T. sanis Bens., iii, 84. |
| T. iopharynx Mörch. | T. subnigritella Bedd. viii, 127. |
| T. kjellerupi Mörch. iii, 74. | T. sulcipes Mörch. iii, 84. |

Philippine Island species.

- | | |
|----------------------------------|----------------------------------|
| T. acutimargo Pfr. iii, 85. | T. luteobrunnea Möll. viii, 120. |
| T. albocincta Pfr. iii, 86. | splendens Hid. non Semp. |
| T. bagoensis Hid. viii, 134. | T. metcalfei Pfr. viii, 121. |
| T. beekiana Pfr. iii, 86. | solaroides Rv. iii, 85. |
| v. kierulfi Mörch. iii, 86. | T. neglecta Pils. viii, 124. |
| T. bintuanensis Hid. viii, 134. | T. quadrasi Hid. viii, 122. |
| T. boettgeri Mlldff. viii, 134. | stenogyra Mlldff. |
| T. conomphala Pfr. iii, 84. | T. radula Pfr. iii, 85. |
| T. costellifera Möll. viii, 125. | T. repanda Möll. viii, 123. |
| T. crossei Hid. viii, 134. | T. rufa Mlldff. viii, 133. |
| T. curvilabrum Rve. iii, 86. | T. sibuyanica Hid. viii. |
| T. gouldi Pfr. iii, 77. | T. splendens Semp. viii, 123. |
| T. granulosa viii, 125. | T. splendidula Möll. viii, 123. |

T. infanda Semp. viii, 120.

T. loocensis Hid. viii, 120.

T. stenozone Mlldff. viii, 133.

T. strigilis Pfr. iii, 85.

Species of Java, Celebes and the Moluccas.

T. bicolor Marts. iii, 82.

T. concolor Bttg. viii, 126.

T. ? costulata Marts.

T. gorontalensis Mts. iii, 83.

T. hartmanni Pfr. iii, 83.

T. planorbis Less. iii, 82.

synæcia Mlldff. viii, 133.

v. *appropinquata* Marts. iii, 82.

v. *lessonii* Marts. iii, 82.

v. *javanica* Marts. iii, 82.

v. *nummus* Issel. iii, 82.

T. planorbis Less.

v. *lardea* Mts. iii, 83.

zollingeri Mouss. not Pfr.

T. sculpticarina Marts. iii, 80.

T. staudingeri Anc. viii, 134.

T. strubelli Bttg. viii, 126.

zonatus v. Hasselt.

T. ternatana Guill. iii, 76.

v. *batchianensis* Pfr. iii, 76.

T. tricolor Marts. iii, 83.

T. zollingeri Pfr. iii, 82.

Species of New Guinea and dependencies.

T. exclusa Fér. iii, 85.

T. infrastrata Sm. iii, 80.

T. lomonti Braz. iii, 82.

T. morio Canefri, viii, 128.

T. nigrans Sm. viii, 128.

v. *cornea* Hedl. viii, 296.

T. papua Less. iii, 89.

T. solarium Q. & G. iii, 80.

Species of the Solomon and New Hebrides groups.

T. apia Jacq. iii, 88.

T. belmorei Cox. iii, 76.

T. catinus Pfr. iii, 74.

T. convexa Hartm. viii, 131.

T. crouanii Guill. iii, 90.

T. crustulum Cox. iii, 90.

T. deiopieia Aug. iii, 89.

T. eudora Ang. iii, 88.

T. exaltata Pfr. iii, 76.

T. fatigata Cox. iii, 76.

T. gassiesi Pfr. iii, 89.

T. godeti Sowb. viii, 129.

T. henschelii Pfr. viii, 130.

T. juanita Ang. iii, 77.

T. matura Pfr. iii, 88.

T. meleagris Pfr. iii, 81.

v. *sebacea* Pfr.

cerealis Cox.

thorpeiana Braz.

T. membranica Pfr. iii, 76.

T. merziana Pfr. iii, 89.

T. partunga Ang. iii, 81.

T. rhoda Ang. iii, 88.

T. rubens Hartm. viii, 129.

T. sancteannæ Sm. iii, 89.

T. scytodes Pfr. iii, 77.

T. semiconvexa Pfr. iii, 88.

T. serena Cox. iii, 77.

T. xiphias Pfr. iii, 89.

T. zenobia Pfr. viii, 131.

Polynesian species, Pelew to Marquesas groups.

- | | |
|------------------------------------|------------------------------------|
| T. abrochroa Crse. iii, 90. | T. nigritlella Pfr. iii, 78. |
| v. pseudoplanorbis Mouss. iii, 91. | v. oppressa Pse. iii, 78. |
| T. accurata Mouss. iii, 80. | T. oleacina Semp. iii, 77. |
| T. alta Pse. iii, 73. | T. pagodula Semp. iii, 77. |
| T. approximata Guill. iii, 90. | T. pallens Pse. iii, 91. |
| T. assimilis Garr. iii, 92. | T. planoconus Mouss. viii, 132. |
| T. concentrica Guill. iii, 81. | T. prostrata Pse. iii, 93. |
| T. contigua Pse. iii, 78. | T. rectangula Pfr. iii, 73. |
| congrua Pse. not Pfr. | hapa H. & J. |
| T. corallina Mouss. iii, 93. | T. samoa H. & J. iii, 81. |
| T. cressida Gld. iii, 91. | T. sansitus Cox. iii, 81. |
| vahine H. & J. | T. subtrochiformis Mouss. iii, 79. |
| T. electra Semp. iii, 86. | v. albostriata Mouss. |
| T. entomostoma H. & J. iii, 79. | T. swainsoni Pfr. iii, 91. |
| T. eurydice Gld. iii, 90. | v. lenta Pse. |
| T. fessonia Ang. iii, 79. | v. scuta Pse. |
| T. fuscata Pse. | T. taviuniensis Garr. viii, 133. |
| T. goniomphala Pfr. iii, 78. | T. tentoriolum Gld. iii, 79. |
| T. kantavuensis Garr. viii, 127. | T. themis Garr. viii, 134. |
| T. küsteri Pfr. iii, 80. | T. transarata Mouss. iii, 79. |
| T. latimarginata Sm. iii, 92. | T. trochiformis Fér. iii, 79. |
| T. lüdersi Pfr. iii, 92. | circumduta Mühl. |
| T. luteocornea Pfr. iii, 90. | T. troilus Gld. iii, 92. |
| T. marmorosa H. & J. iii, 90. | T. tuber Mouss. iii, 81. |
| T. merzianoides Garr. viii, 132. | T. tumulus Gld. iii, 91. |
| T. navigatorum Pfr. iii, 90. | |

Species of unknown habits.

- | | |
|------------------------------|-----------------------------------|
| T. conferta Pfr. iii, 81. | T. securiformis Dh. iii, 78. |
| T. hidalgoana Crse. iii, 93. | T. valenciennesii Guill. iii, 93. |
| T. pagodula Pfr. iii, 73. | guilloui Pfr. |
| T. planissima Pfr. iii, 93. | T. virgulata Sowb. iii, 77. |
| T. rudiuscula Pfr. iii, 93. | |

Genus PUNCTUM Morse, 1864.

Punctum MORSE, Obs. on the Terrest. Pulm. Maine, Journ. Portl. Soc. Nat. Hist. 1864, p. 27. Type *P. minutissimum* Lea.—See also BINNEY, Second Suppl. Terr. Moll. v, Bull. Mus. Comp. Zool. xiii, no. 2, t. 3, f. 4, 6.—SCHAKO, Mal. Blätter xx, p. 178, f. A-D.—

JICKELI, Fauna der Land- und Süßwasser Moll. N.-O. Afrika's, in Verh. K. Leopoldinisch-Carolinisch Deutschen Akad. der Naturforscher, xxxvii, p. 54, t. 1, f. 4.

Shell minute, thin, subdiscoidal but with convex spire, openly umbilicated; unicolorous; whorls about 4, convex, the apical $1\frac{1}{2}$ smooth, rather distinctly demarked from the following whorls, which have oblique striae or irregular riblets and excessively fine spiral striae; the last whorl cylindrical, not descending in front. Aperture lunate, rounded; lip simple, thin. Type *P. pygmaeum* var. *minutissimum*, pl. 1, figs. 11, 12, 13.

Jaw arcuate or horse-shoe shaped, composed of numerous (13-19) separate rhomboidal plates, more or less overlapping, the outer imbricating over the inner plates; the median two or three plates slightly separated, not overlapping.

The individual plates are composed of vertical chitinous fibers forming a fringe at the edges (fig. 6, 7, *P. pygmaeum*); the plates are bound together by a thin transparent membrane. The number of plates varies somewhat, *P. pygmaeum* (fig. 6) having 19 (*Schako*); *P. pygmaeum* var. *minutissimum* having 16 (*Morse*); *P. conspectum* (fig. 9) having 14 to 16, *P. cryophilum* (fig. 5) having 13 plates.

Radula rather long and narrow; teeth rather separated, not in the least overlapping. Central tooth tricuspid, the mesocone longest, but not as long as the narrow basal-plate, side cusps small. Lateral teeth having wider rhombic basal-plates and bicuspid, the mesocone having a longer cusp. Marginal teeth not differentiated in any way from the laterals, but becoming lower with shorter cusps (pl. 1, fig. 8, *conspectum*.)

The number of transverse rows of teeth is 75 in *P. conspectum*, the formula 17-1-17 (*Pilsbry*); in *P. pygmaeum* there are 114 rows of 19-1-19 teeth (*Schako*); in *P. pygmaeum* var. *minutissimum*, Morse counted 54 rows of 13-1-13 teeth; in *P. cryophila* there are 75 rows of 16-1-17 teeth, according to Jickeli. Each transverse row bends forward in the middle, as shown in the line above fig. 8, representing the curve of a half row.

Distribution: North America, Europe, northern Asia and north-eastern Africa.

This genus differs from the other Patuloid Helices in having the jaw composed of broad rhombic plates which are not in the least soldered together, and in the peculiar form of the bicuspid lateral teeth. It is evidently a type of vast antiquity, and probably has

actual affinity to the Neozelandic genus *Laoma*; both may perhaps be regarded as remnants of a Palæozoic fauna.

The minute species of *Discus*-like shells must all be re-examined with especial reference to the characters of the jaw before a complete list of the species of *Punctum* can be made. It is not unlikely that *micropleuros* Paget, *elachia*, *debeauxiana*, *poupillieri*, *aucapitaneana* and *massoti* Bgt., etc., will be found to belong here. For the present it seems the wisest course to group in *Punctum* only such species as are known to have the characteristic anatomical features of that genus, leaving unexamined minute Patuloid forms in *Patulastra*.

The species of *Punctum* live upon rotten or decaying logs in forests.

P. pygmæum Drap. iii, 29.

P. conspectum Bld. ii, 203.

schwerzenbachiana Calc.

P. cryophilum Mts. iii, 32.

v. minutissimum Lea.

Genus LAOMA Gray, 1849.

Laoma GRAY, Proc. Zool. Soc. Lond. 1849, p. 167; type *Bulimus?* (*Laoma*) *leimonias*.—*Phrizgnathus* HUTTON, Trans. N. Z. Inst. xv, p. 136, 1882; types *H. fatua*=*P. celia* Hutt., and *P. marginatus* Hutt.—See also HUTTON, Tr. N. Z. Inst. xvi, p. 168.—SUTER, Tr. N. Z. Inst. xxiii p. 92 and xxiv, p. 297.

Shell more or less trochiform, thin, perforate or umbilicate, the periphery keeled, at least in the young; horn-colored, striped radially with tawny. Aperture rhombic, provided with entering lamellæ, or without them; lip thin, simple. Type *L. leimonias* Gray, pl. 1, fig. 1.

Animal heliciform, the mantle subcentral, its edge slightly reflected over the peristome; no locomotive disc nor mucus pore.

Jaw arcuate, composed of 20 to 24 rhombic or oblong plates which are hairy-papillose and fringed at the upper and lower margins (pl. 1, fig. 4, *L. glabriuscula* Pfr.)

Radula having the central tooth rather narrow, unicuspid (or tricuspid), the mesocone much shorter than the basal-plate. Lateral teeth wider, rectangular, with two cusps which are either subequal or the inner one larger. Marginal teeth low, wide, with two short cusps, becoming obsolete on the outermost teeth (pl. 1, fig. 3, *L. glabriuscula*; pl. 1, fig. 2, *L. acanthinulopsis*.)

The number of teeth in a transverse row is 35.1.35 in *L. marginata*, 21.1.21 in *acanthinulopsis*, 26.1.26 in *marina*; the last named species has 110 straight transverse rows.

Distribution : All of the species known to belong to this genus inhabit New Zealand and Tasmania. Two sections may be distinguished :

Section *Laoma* Gray, *s. str.* Aperture provided with an entering lamella upon the columella only, or with lamellæ upon columella, parietal wall and outer and basal lips (pl. 1, fig. 1, *L. leimonias*). The writer has examined specimens of all of the species ; *L. pæcilsticta* from a transition to *Phriægnathus*.

Section *Phriægnathus* Hutton. Shell and animal the same as in *Laoma*, except that the aperture has no teeth or folds within. (Type *L. celia* Hutt., pl. 1, fig. 10). This name cannot be used in a generic sense on account of the priority of Gray's *Laoma*. The mere absence of aperture-teeth is, of course, not sufficient for generic distinction.

The fibrous jaw, composed of rhombic plates bound together by a thin membrane only, and the peculiar bicuspid side teeth, agree exactly with the genus *Punctum* ; and upon these grounds the two genera were associated by the writer, forming the group *Polyplacognatha* (Proc. Acad. Nat. Sci. Phila. 1892, p. 403.)

(Section *Laoma* Gray.)

<i>L. leimonias</i> Gray, iii, 68.	<i>L. marina</i> Hutt. viii, 57.
<i>L. pæcilsticta</i> Pfr. iii, 68.	<i>nerissa</i> Hutt.
<i>pæcilocostata</i> Pfr. <i>olim.</i>	<i>L. pirongiaensis</i> Sut.

Section *Phriægnathus* Hutt.

<i>L. mariæ</i> Gray. iii, 37.	<i>L. allochroida</i> Sut. viii, 63.
<i>umbraculum</i> Pfr.	<i>v. sericata</i> Sut. viii, 64.
<i>L. conella</i> Pfr. viii, 58.	<i>v. lateumbilicata</i> Sut. viii, 64.
<i>L. ariel</i> Hutt. viii, 59.	<i>L. campbellica</i> Filh.
<i>L. marginata</i> Hutt. viii, 60.	<i>L. phrynia</i> Hutt. viii, 61.
<i>L. celia</i> Hutt. viii, 60.	<i>L. fatua</i> Pfr.
<i>L. regularis</i> Pfr. iii, 37.	<i>L. glabriuscula</i> Pfr. iii, 37.
<i>L. erigone</i> Gray, iii, 37.	<i>L. sciadium</i> Pfr.
<i>heldiana</i> Pfr.	<i>L. titania</i> Hutt. viii, 62.
<i>L. microreticulata</i> Sut. viii, 63.	<i>L. haasti</i> Hutt. viii, 62.
<i>L. pumila</i> Hutt. viii, 63.	<i>L. acanthinulopsis</i> Sut. viii, 61.
<i>L. raricostata</i> Sut. viii, 100.	<i>L. transitans</i> Sut. viii, 59.

(Tasmanian Species.)

L. cæsa Cox. iii, 261.*L. henryana* Pett.*cæsus* Cox.*L. pictilis* Tate.*v. occulta* Cox. iii, 264.

Genus FLAMMULINA Martens, 1873.

Flammulina Mts., Crit. List Moll. N. Z., p. 12.—*Gerontia* HUTTON, Trans. N. Z. Inst. xv, p. 135.—PILSBRY, Nautilus vi, p. 55; Manual viii, p. 64.—Family *Phenacohelidae* SUTER, Trans. N. Z. Inst. xxiv, p. 270, 1892.

Shell thin, varying from discoidal to subtrochiform, umbilicated or perforated, the perforation sometimes closed; generally somewhat translucent; surface striate or ribbed, often decorated with reddish flammules. Embryonal 1-1½ whorls smoother, often spirally striated. Aperture rounded lunar, lacking folds, teeth or internal callus; the lip thin and simple, somewhat dilated at the columella.

Animal with a narrow foot bearing a mucous gland at the tail, sometimes surmounted by a papilla. Genitalia unknown; mantle subcentral, its margin even, and slightly reflexed over the peristome of the shell.

Jaw delicate, composed of thin vertical laminæ firmly soldered together but showing more or less of the overlapping edge of each plate.

The radula exhibits a considerable amount of variation in the different species, but the extremes are connected by all intermediate forms. That of *F. (Thalassohelix) ziczac*, drawn by the author from an Auckland specimen, on pl. 3, fig. 28, may be taken as an example.

The central tooth has a moderate or long mesocone, ectocones being entirely lacking in some forms, present and well developed in others. The laterals are not crowded, and generally have a long mesocone and short ectocone, but often the entocones also are developed, making the tooth tricuspid. The marginals are formed by the shortening of the basal-plate and increase in size and obliquity of the cusps, the mesocone in most forms remaining distinctly larger, sometimes becoming bifid, probably by fusion with the entocone. The ectocone persists on the marginal teeth, either as a simple cusp, as in *F. ziczac*, or becoming split into several distinct points, as in the *Allodiscus* species, and in the latter the tooth becomes very wide. In one sub-genus, *Phacussa*, the ectocone is lost on the marginals, but they retain the characteristic rhomboidal basal-plate; and *Thalassohelix* exhibits a form of marginals connecting *Phacussa* with the more normal

Flammulinas. *In no case does the ectocone unite with and ascend the mesocone on the marginals as is the case in all genera of Zonitidae which retain ectocones upon the marginal teeth.*

Distribution, New Zealand, New Caledonia, Lord Howe Island, Australia and Tasmania.

A group of rather small shells differing from *Zonitidae* in the forms of the marginal teeth of the radula and the plaited jaw, and from *Endodonta* and its subdivisions in the possession of a well developed caudal mucous gland. The numerous species have been distributed into many groups which are considered genera by some authors, but which intergrade so closely in all essential characters that I am compelled to class them as sections or at most subgenera. Their differential characters seem no more generic than those distinguishing *Tachea*, *Macularia* and *Pomatia* among European Helices, or *Mesodon*, *Triodopsis* and *Stenotrema* among American. Genera should, it is believed, be founded upon really tangible structural differences, either in shell, animal or both; and such differences these groups do not seem to possess. They are however of value as subgeneric divisions. The investigation of the genitalia may lead to more satisfactory results, but I expect to find but little differentiation within the genus.

Our knowledge of these forms and their anatomy is mainly due to Professor F. W. HUTTON and Mr. H. SUTER, who have investigated the dentition of a majority of the New Zealand species. See Hutton, in Trans. N. Z. Inst. xiv, xv, and xvi, and Suter, in Tr. N. Z. Inst. xxiii and xxiv. Messrs Hedley and Suter have revised the nomenclature in Proc. Linn. Soc. N. S. Wales (2) vii.

The characteristics of *Flammulina* may warrant the surmise that they have been modified to occupy in New Zealand the place filled in the economy of nature by *Zonitidae* in other regions. If this be true, the anomalous dentition of *Phacussa* must be regarded as a recent adaptive modification.

For the generic title of this group the writer, in 1892, selected Hutton's name GERONTIA, this being the oldest designation proposed for species then known to him to belong to the genus. There are, however, three prior names, *Flammulina* Martens, which being the earliest is now adopted, and *Monomphalus* and *Rhytidopsis* of Aucey, which are also believed to apply to members of this genus. The presence of a caudal mucous-secreting gland, however, has not been ascertained in the species of these New Caledonian groups, so that their relationship to *Flammulina* is uncertain.

The following sectional or subgeneric divisions may be distinguished :

Phacussa Hutt., p. 12.	Phenacohelix Sut., p. 16.
Thalassohelix Pils., p. 12.	Flammulina Mart., p. 17.
Gerontia Hutt., p. 14.	Suteria Pils., p. 17.
Allodiscus Pils., p. 14.	Hedleyoconcha Pils., p. 18.
Pyrrha Hutt., p. 15.	Monomphalus Anc., p. 19.
Therasia Hutt., p. 15.	Rhytidopsis Anc., p. 20.

Subgenus PHACUSSA Hutton, 1883.

Phacussa HUTTON, Trans. N. Z. Inst. xv, p. 138 (proposed for *Zonites* (?) *helmsi* and *fulminata*.)

Shell depressed, umbilicated; the spire convex, periphery rounded. Whorls striate or with fine ribs, the apical $1\frac{1}{2}$ whorls smooth. Aperture rounded-crescentic, peristome simple. Type *F. helmsi* Hutt. (pl. 3, figs. 10, 11, *F. hypopolia* Pfr.)

Animal elongated; foot very narrow and long, compressed, not tapering, truncated posteriorly and with a caudal gland; mantle slightly reflected; eye peduncles long and thick, tentacles moderate (*Hutton, Ph. helmsii*.)

Jaw arcuate, slightly tapering toward the ends, with numerous flat imbricating vertical plaits (20–25 in *helmsi*, about 45 in *hypopolia*) which denticulate the margins (pl. 2, figs. 2, 3, *F. hypopolia*.)

Dentition: About 110 nearly straight transverse rows of 15–11–1–11–15 to 17–13–1–13–17 teeth. Central tooth with a wide mesocone and minute ectocones. Lateral teeth tricuspid, the entocone minute, obsolete on the outer ones. Marginal teeth having the basal-plate subquadrate, mesocone very long and oblique, lacking side cusps (pl. 2, fig. 1, *F. hypopolia*.)

Distribution, New Zealand. The shell in this group is very similar to that of *Phenacohelix*, but the marginal teeth lack side cusps, the mesocone being strongly developed, giving it a Zonitoid aspect.

F. helmsi Hutt. *F. hypopolia* Pfr. ii, 181.

v. maculata Hutt. *F. fulminata* Hutt.

Subgenus THALASSOHELIX Pilsbry, 1892.

Thalassohelix PILSBRY, The Nautilus, Sept. 5, 1892, p. 56, type *H. zelandiae* (Gray) Hutton.—*Thalassia* of HUTTON and other New Zealand authors.—Not *Thalassia* ALBERS, Die Hel. 1860, p. 59. Not *Thalassia* Chevrolat, 1834, a genus of Coleoptera.

Shell umbilicated, thin, depressed or trochiform, the periphery acutely keeled (*zelandiae*), bluntly angled (*obnubila*), or rounded

(*ziczac*). Apical whorls most minutely spirally striated or smooth. Aperture rather large, lip thin, simple, subreflexed at columella. Type *F. zelandiæ*, pl. 3, fig. 29.

Animal with narrow foot bearing a caudal mucous gland with a papilla above it; mantle slightly reflected over the peristome.

Jaw arcuate, with flat plaits.

Dentition: central tooth with a short mesocone, the ectocones obsolete; laterals with a short ectocone, which disappears on the marginals, leaving a long, oblique mesocone only (pl. 3, fig. 27, *F. zelandiæ*.)

Distribution New Zealand and Tasmania. The shells included by Messrs Hedley and Suter in this division are rather dissimilar in form. The dentition resembles *Phacussa* in the prominence of the mesocones and obsolescence of ectocones on the marginal teeth, and this peculiarity also serves to distinguish *Thalassohelix* from *Therasia*, the shell of which is of similar form. Certain Tasmanian forms have recently been referred by Suter to this group,—a relationship previously suspected by the writer.

New Zealand species.

- | | |
|---------------------------------|---|
| <i>F. ziczac</i> Gld. ii, 210. | <i>sigma</i> Pfr. MS. |
| <i>portia</i> Gray. ii, 213. | <i>F. propinqua</i> Hutt. viii, 72. |
| <i>kappa</i> Pfr. | <i>F. zelandiæ</i> Gray. ii, 214. |
| <i>collyrula</i> Rve. | <i>neozelanica</i> Hutt. |
| <i>F. igniflua</i> Rve. i, 129. | v. <i>antipoda</i> H. & J. ii, 214. |
| <i>lambda</i> Pfr. | <i>F. aucklandica</i> (Le Guill.) Hutt. |
| v. <i>obnubila</i> Rve. i, 120. | <i>aucklandica</i> Guill. |

Australian and Tasmanian species.

[Compiled by Charles Hedley.]

- | | |
|------------------------------------|----------------------------------|
| <i>F. fordei</i> Brazier. | <i>F. hamiltoni</i> Cox. |
| <i>allporti</i> Legrand, iii, 263. | <i>cæpta</i> Cox. iii, 263. |
| <i>austrinus</i> Cox. iii, 264. | <i>ducani</i> Cox. iii, 46. |
| <i>fernshavensis</i> Petterd. | <i>floodi</i> Brazier. iii, 46. |
| <i>helice</i> Cox, iii, 261. | <i>irvinæ</i> Cox. iii, 46. |
| <i>macoyi</i> Petterd. | <i>kingi</i> Brazier. iii, 46. |
| <i>medianus</i> Cox, iii, 264. | <i>langleyana</i> Brazier. |
| <i>petterdi</i> Cox. | <i>nulligani</i> Brazier. |
| <i>positura</i> Cox, iii, 262. | <i>puscoei</i> Brazier. iii, 46. |
| <i>tabescens</i> Cox. | <i>plexus</i> Cox. iii, 262. |
| <i>tranquilla</i> Cox. | <i>savesi</i> Petterd. iii, 46. |

- | | |
|-------------------------------------|-------------------------------------|
| <i>F. georgiana</i> Quoy & Gaimard. | <i>F. hamiltoni</i> Cox. |
| <i>F. trajectory</i> Cox. iii, 264. | <i>scrupulus</i> Cox. iii, 46. |
| <i>F. wynyardensis</i> Petterd. | <i>spoliata</i> Cox. iii, 46. |
| | <i>stephensi</i> Cox. iii, 46, 262. |

Subgenus GERONTIA Hutton.

Gerontia HUTTON, Trans. N. Z. Inst. xv, p. 135.—*Gerontia* (typog. err.) in N. Z. Journ. of Sci. i, p. 476.

Shell *depressed and openly umbilicated, having the contour of Patula*; thin, rather fragile, the surface delicately sculptured with fine cuticular riblets. Apical whorl minutely granular, or showing a few weak spirals, having a minute perforation at the tip. Type *F. pantherina* Hutton, pl. 3, figs. 1–3.

Animal heliciform, mantle rather posterior, included; tail acute with a mucous pore but no papilla.

Jaw vertically striated (pl. 2, fig. 5, *F. pantherina*.)

Dentition: central teeth tricuspid, cusps with moderate cutting points. Laterals similar, but the ectocones larger than the entocones; transition teeth bicuspid by fusion of entocone with mesocone. Marginals with a broad bifid cusp (pl. 2, fig. 4, *F. pantherina*.)

The shell is like a thin *Selenites* with delicate close riblets. It is more broadly umbilicated than in the other subgenera of this genus. The two species are from New Zealand.

F. pantherina Hutt. viii, 65. *F. cordelia* Hutt. viii, 66.

Subgenus ALLODISCUS Pilsbry, 1892.

Psyra HUTTON, Trans. N. Z. Inst. xvi, p. 201, 1884. First species *P. dimorpha*. Not *Psyra* Stal, 1876.—*Allodiscus* PILSBRY, Nantilus vi, p. 56, Sept. 5, 1892; Man. Conch. (2), viii, p. 66.

Shell thin, orbicular and *depressed, with low or flat spire, rounded periphery, and narrow or subimperfurate umbilicus*; surface radially rib-striated, *not hairy*, the embryonic $1\frac{1}{2}$ whorls spirally striated (pl. 3, fig. 12, *F. tullia*). Aperture crescentic scarcely oblique; peristome thin, shortly reflexed at the columella; parietal wall nude. Type *H. dimorpha* Pfr. (See pl. 3, figs. 4, 5, 6, *F. planulata* Hutt.)

Jaw slightly arcuate, not tapering toward the ends, flatly ribbed or plaited (pl. 2, fig. 11, *F. tullia*; pl. 2, fig. 13, *F. godeti*.)

Dentition: central tooth with tricuspid reflection, mesocone long. Lateral teeth bicuspid, the entocone being suppressed, or tricuspid.

Marginal teeth broad, with 3 to 5 cutting points (pl. 2, fig. 14, *F. godeti*). In *F. tullia* the side cusps of the centrals are minute; inner marginals tricuspid, outer bicuspid (pl. 2, fig. 12, *F. tullia*; pl. 2, fig. 14, *F. godeti*). In *F. dimorpha* the side cusps of the central tooth are minute; the marginals have a long bifid inner cusp (mesocone, or fused mesocone and entocone), and by splitting, two ectocones.

F. dimorpha Pfr. ii, 211.

F. adriana Hutt. viii, 67.

F. venulata Pfr. ii, 211.

F. miranda Hutt. viii, 68.

F. cassandra Hutt. viii, 66.

F. godeti Sut. viii, 68.

F. tullia Gray. ii, 211.

F. wairoaensis Sut.

F. planulata Hutt. viii, 67.

F. urquharti Sut.

Subgenus PYRRHA Hutton, 1884.

Pyrrha HUTTON, Trans. N. Z. Inst. xvi, p. 200.

Shell depressed-globose, thin, translucent, striated and minutely reticulated, imperforate; the periphery rounded, spire convex. Peristome simple, reflexed over the minute perforation. Type *P. cressida* Hutt., pl. 3, figs. 17, 18, 19.

Animal heliciform, mantle subcentral, reflected over the peristome with an even margin; tail truncate, with a large papilla and mucous gland.

Jaw arcuate, flatly ribbed (pl. 2, fig. 9, *F. cressida*.)

Dentition: central tooth with the mesocone only developed. Laterals bicuspid, the entocones suppressed. Marginal teeth with several cusps (pl. 2, fig. 10, *F. cressida*.)

The single species inhabits New Zealand.

G. cressida Hutton, viii, 72.

Subgenus THERASIA Hutton, 1883.

Therasia HUTT., N. Z. Journ. of Sci. i, p. 477 (proposed for *tamora*, *valeria* and *thaisa*.)

Shell depressed, perforate or umbilicate, thin, with conoidal spire; the periphery angular or subangular; aperture round-lunar; lip thin, slightly reflexed at the columella. Surface striated. Embryonic whorls spirally striated. Type *T. thaisa* Hutton, pl. 3, figs. 14, 15, 16.

Resembles *Allodiscus* in the dentition, and the spirally striated apex of the shell, but differs in the form and sculpture of the latter, which is much as in section *Thalassohelix*.

Animal elongated; mantle subcentral, included; foot long and narrow, reaching beyond the shell, rounded behind, slightly truncated, and with a mucous gland situated under a caudal papilla (Hutton, *F. thaisa*.)

Jaw membranaceous, arcuate (*F. thaisa*) or horse-shoe shaped (*F. decidua*, pl. 2. fig. 19), with broad imbricating plates.

Dentition: central teeth narrow, with small reflection, the mesocone long; ectocones hardly visible. Lateral teeth with larger reflection, the inner ones without side cusps, the outer tricuspid. Marginal teeth in *thaisa* (pl. 2, fig. 21) multicuspid; in *decidua* (fig. 20) first bicuspid, then tricuspid, rounded at the anterior margin; the outer 2 or 3 marginals are bicuspid.

Distribution: New Zealand.

F. celinde Gray. ii, 211.

F. thaisa Hutt. viii, 70.

F. valeria Hutt. viii, 69.

F. decidua Pfr. viii, 71.

F. ophelia Pfr. ii, 211.

F. traversi Smith, ii, 214.

F. tamora Hutt. viii, 70.

Subgenus PHENACOHILIX Suter, 1892.

Phenacohelix SUTER, Trans. N. Z. Inst. xxiv, p. 270.—*Fruticicola* HUTTON, *olim*, not of Held.

Shell *depressed, umbilicated*, subdiscoidal, the spire slightly convex or conoidal, *periphery broadly rounded*. Whorls finely ribbed, the apical one smooth except for microscopic spiral striæ. Aperture lunate, the lip simple. Type *F. pilula* Rve., pl. 3, fig. 13.

Animal elongated, the foot narrow, projecting behind the shell; mantle subcentral, rather anterior, included; eye peduncles long, rather clavate; tentacles moderate. Hutton, from whose paper the above description of the animal of *F. granum* is quoted, does not mention a caudal mucous pore, but it is doubtless present.

Jaw arcuate, with about 35 flat ribs which indent the concave but not the convex margin (pl. 2, fig. 6, *F. pilula*.)

Dentition: central tooth with small side cusps (*F. granum*) or none (*F. pilula*); laterals similar, lacking entocones. Marginal teeth multicuspid, the inner cusp larger (pl. 2, fig. 7, *F. pilula*.)

Distribution, New Zealand. The shell is very like that of *Phacussa* but the marginal teeth differ widely.

F. pilula Rve. ii, 212.

F. granum Pfr. ii, 212.

iota Pfr.

F. chordata Pfr.

Subgenus SUTERIA Pilsbry, 1892.

Sutera PILS., The Nautilus, Sept. 5, 1892, p. 56, type *H. ide* Gray.—*Charopa* HUTTON, olim, not Albers.—*Patulopsis* SUTER, Trans. N. Z. Inst. xxiv, p. 270, 1891, type *H. ida* Gray; not *Patulopsis* Strebel, 1879, a Mexican group of *Zonitidae*.

Shell thin and rather opaque, *openly umbilicated; discoidal, the spire flat; periphery broadly rounded*. Surface having low spirals, and *radial, undulating cuticular lamellae bearing hairs*; $1\frac{1}{2}$ apical whorls smooth. Lip thin, simple. Type *H. ide* Gray, pl. 3, figs. 24–26.

Animal rather short and narrow; mantle subcentral, rather anterior, slightly reflexed over the peristome of the shell; foot narrow, extending behind the shell, the tail truncated and furnished with a mucous gland; no locomotive disc. Eye peduncles very long, cylindrical, approximate at their bases; tentacles long. (*Hutton* for *H. ide*.)

Jaw with 30 flat plaits, each transversely striated.

Dentition: centrals tricuspid, the mesocone long, ectocones short and constricted on the outer sides. Lateral teeth similar, but the entocone smaller than the ectocone. Inner marginals with one bifid cusp, the outer with several subequal cusps (pl. 2, fig. 8, (*F. ide*.)

The principal feature of the umbilicated discoidal shell is its *hairy, undulating ribs*. The dentition is characterized by the presence of entocones on the lateral teeth; but *Gerontia pantherina*, *Allodiscus planulata* and other forms have this same feature. The single species is from New Zealand.

F. ide Gray, ii, 210.

ida auct.

Subgenus FLAMMULINA v. Martens, 1873.

Flammulina MART., Critical List of N. Z. Moll., p. 12.—HEDLEY & SUTER, Proc. Linn. Soc. N. S. Wales, (2) vii, p. 643, 1892.—*Amphidoxa* of N. Z. authors, not of Alb.—*Calymina* HUTTON, Tr. N. Z. Inst. 1884, p. 199, not of Hübner, 1816.

Shell narrowly umbilicated or imperforate, globose or depressed, thin, fragile, subpellucid, composed of few rapidly widening whorls, which are either smooth and glossy or striated. Aperture large, rounded-lunar; lip thin, simple, slightly expanded at the columellar insertion. Type *F. zebra* Le Guill., pl. 3, fig. 23.

Animal carrying the shell subcentrally, mantle edge slightly reflected over the peristome of the shell, with an even margin; tail depressed, rounded, with a mucous gland (*Hutt.*)

Jaw delicate, more or less arcuate, with numerous vertical plaits, which generally crenulate the lower margin (pl. 2, fig. 14, *F. corneofulva*. Pl. 2, fig. 18, *F. chiron*.)

Dentition: Rhachidian teeth with the mesocone well developed, ectocones small (absent in *corneofulva*). Lateral teeth similar to the central. Marginal teeth tricuspid (sometimes 4-cuspid), in some species the cusps coalescing on the outer teeth (pl. 2, fig. 16, *F. corneofulva*. Pl. 2, fig. 17, *F. chiron*.)

Distribution: New Zealand and Lord Howe Island.

The contour of the shell is between *Hyalina* and *Vitrina*, and in texture it is nearly as fragile as the latter. Both striped and uni-colored species occur. In typical *Flammulina* the surface is smooth and polished. In the section *Calymna* Hutton (Tr. N. Z. Inst. xvi, p. 199, 1884), the surface is finely striated. Pl. 3, figs. 20-22 represent *G. costulata* Hutt., the type of *Calymna*.

<i>F. compressivoluta</i> Rv. i, 128.	<i>F. jacquetta</i> Hutt. viii, 76.
<i>omega</i> Pfr.	<i>F. perdita</i> Hutt. viii, 76.
<i>F. cornea</i> Hutt. viii, 75.	<i>F. crebriflammis</i> Pfr. i, 130.
<i>F. zebra</i> Le Guill. viii, 76.	<i>F. corneofulva</i> Pfr. viii, 76.
<i>phlogophora</i> Pfr.	<i>F. novaræ</i> Pfr.
<i>flammigera</i> Pfr.	<i>F. chiron</i> Gray, viii, 77.
<i>multilimbata</i> H. & J.	<i>F. mastersi</i> Braz. viii, 294.

* * *

<i>F. costulata</i> Hutt. viii, 73.	<i>F. feredayi</i> Sut. viii, 74.
<i>F. lavinia</i> Hutt. viii, 74.	v. <i>glacialis</i> Sut.
<i>F. olivacea</i> Sut. viii, 75.	

Subgenus HEDLEYCONCHA Pilsbry, 1893.

Shell perforated, trochiform, keeled, thin, with oblique riblets and minute spiral lines. Aperture angulate-lunate, peristome simple, thin, slightly expanded at the columella. Type *H. delta* Pfr.

Animal 13 mill. in length, color white almost translucent; posterior part of body sharply keeled, *terminating in a mucous gland*; a shallow furrow starts from the end of the tail and runs forward on each side to the lips, the surface below this furrow being smooth, above it

finely tuberculate. Tentacles moderately long, cylindrical. Habits very active; emitting, when crawling, abundance of transparent mucous. Pl. 9, fig. 27.

Jaw low, arcuate, the ends rounded, recurved; with a blunt median projection below; crossed by numerous fine folds (pl. 9, fig. 28.)

Dentition: all teeth having basal-plates of the usual quadrate form. Centrals tricuspid, the mesocone projecting beyond the lower margin of the basal-plate, side cusps not quite reaching half the length of the plate. Inner laterals similar but slightly oblique; on the outer laterals the entocone increases and the ectocone diminishes. Marginals with the basal-plate low and wide, bearing the large, sub-equal ento and mesocones, and a bifid or trifid ectocone; the extreme marginals having an irregularly serrated edge (pl. 9, fig. 29.)

The trochoidal shell resembles that of the keeled *Thalassohelix* species, but the low, wide and multicuspid marginal teeth offer a contrast to those of that group.

Our knowledge of the anatomy of this group is due to Charles Hedley's researches (Proc. Roy. Soc. Queensl. v, p. 152, and vi, p. 250); the figures were drawn from specimens collected on Little Nerang Creek, Queensland, where it was found abundantly on the trunks of trees.

F. delta Pfr. ii, 215.

conoidea Cox.

fenestrata Cox.

Subgenus *MONOMPHALUS* Aucey, 1882.

Monomphalus . . . Le Naturaliste 1882, p. 86 (*M. bavayi* and *heckelianus*); AUCEY, Bull. Soc. Mal. Fr. v, p. 370.—TRYON, Manual i, p. 114.

Shell thin, discoidal, the spire slightly concave, umbilicus reduced to a mere chink; periphery broadly rounded. Sculptured with fine riblets, the embryonal whorl showing very fine spiral striae. Aperture vertical, lunate, lip thin, dilated over the perforation. Type *F. rossiteriana* Crosse, pl. 3, figs. 7, 8, 9.

Soft parts unknown. Distribution, New Caledonia.

This group is very similar in shell characters to *Allodiscus*, and the two may require to be united. They are here retained separate because the anatomy of the New Caledonian forms is unknown, and may prove sufficiently different.

G. rossiteriana Crosse. i, 114.

heckeliana Crse.

G. bavayi Crosse. i, 114.

G. gentilsiana Crosse. i, 115.

G. cerealis Crosse. i, 114.

G. lifuana Montr. i, 115.

Subgenus RHYTIDOPSIS Ancey, 1882.

Rhytidopsis Le Naturaliste 1882, p. 85; ANCEY, Bull. Soc. Mal. Fr. V, p. 371, 1888.

Shell globose-depressed, narrowly umbilicated, thin but rather strong. Whorls about $5\frac{1}{2}$, slowly increasing, the last rounded at the periphery. Aperture subvertical, oblong-lunate; lip sharp, gently sinuous below, dilated at the columella. Type *H. chelonites* Crosse, pl. 6, figs. 69, 70.

Jaw widely arcuate grooved by 18 indistinct rather wide lamellæ which denticulate its cutting edge.

Lingual ribbon 1 mill. long, $\frac{1}{2}$ mill. wide; teeth according to the formula 12-8-1-8-12. The central teeth are as large as the lateral, tricuspid, the side cusps small, median cusp elongated. Lateral teeth having a rudimentary entocone, a large mesocone, and a sloping bicuspid ectocone. Marginal teeth forming an angle with those of the middle field, they are spaced, gradually increasing, and bear three cusps, the entocone and mesocone being united toward their bases, the ectocone smaller.

Our knowledge of the dentition of *H. chelonites* rests upon a note by Saint-Simon, in Bull. Soc. d'Hist. Nat. de Toulouse 1880, pp. 171, 174. The jaw and teeth agree well with those of other sections of the genus *Flammulina*, but whether a caudal mucous gland is present or not remains to be ascertained. Ancey's name appeared anonymously in 1882. It is not easy to decide what effect this should have on nomenclature.

F. chelonites Cr. i, 117.

v. *major* Anc.

F. prevostiana Cr. i, 123.

F. corymbus Cr. i, 117.

F. (?) minutula Cr.

Genus ENDODONTA Albers, 1850.

Endodonta ALBERS, Die Hel., p. 89.—MARTENS, Die Hel. (edit. 2), p. 90. Not *Endodonta* Lansb., Notes Leyden Mus. viii, p. 108 (Coleoptera), 1886.

Shell small, varying from discoidal to trochiform, generally umbilicated; the surface striate or ribbed. Aperture varying from multidentate to toothless; peristome simple. Type, *E. lamellosa* Fér.

Animal having distinct grooves above the margins of the foot, but no caudal mucous gland. Eye peduncles club-shaped. Genital system simple, lacking all accessory appendages. Jaw delicate, vertically sparsely striated. Radula having the basal-plates of central and lateral teeth large and square; central teeth tricuspid; lateral teeth tricuspid or lacking the endocones; marginal teeth having a low, wide basal-plate, bearing 3 or 4 cusps, the endocone and mesocone generally united at base, ectocone simple or bifid.

Distribution, Australasia and Polynesia.

This genus differs from *Flammulina* (and its subgenera) in lacking caudal mucous pore, and in the striated rather than plaited jaw; from *Pyramidula* in the clavate eye-peduncles.

No one, I believe, who examines large series of the species from various regions, will claim that the groups included as sections under *Endodonta*, can be admitted as genera. They have no anatomical differential characters whatever, as far as is now known, and the shell features integrate by easy stages throughout.

The distinction between *Charopa* and *Endodonta* is of little value, on account of the degeneration of the teeth in some forms of the latter, producing species which technically fall under the former group. In this genus, therefore, as in many others (such as *Gastrodonta*, *Polygyra*, *Lucerna*, *Sagda*, etc.), the presence or absence of teeth or lamellæ within the aperture is of scarcely more than specific value, or at most, serves to define groups of no more than sectional rank.

The principal authorities upon the shells now assembled here are Pease, Garrett, Cox, Brazier, Huttón, Semper, Suter and Hedley. Mousson, Gassies, Crosse and Pfeiffer have also contributed to the literature. Notwithstanding the great amount of work which has been done, a vast field for future labor remains. The anatomy is but little known except in the New Zealand species, and very few acceptable figures of the shells have been published. In this genus, figures should be drawn of sufficient size to show clearly all features of the shell, and this cannot be done with figures much smaller than those illustrating the present work.

KEY TO SUBGENERA.

- a.* Aperture provided with teeth, folds or spiral liræ.
 - b.* Parietal callus elevated at edge into a transverse lamella ; base glossy, *Brazieria.*
 - bb.* Teeth or lamellæ internal, spirally entering or tubercular,
 - c.* Form elevated conical ; columella calloused, *Diglyptus.*
 - cc.* Form not high conic, diam. greater than alt. ; no heavy columellar nodule.
 - d.* Umbilicus pouch-shaped, wide within, constricted at opening, *Libera.*
 - dd.* Umbilicus not pouch-shaped, open or imperforate, *Endodonta.*
- aa.* Aperture lacking teeth, internal folds or liræ.
 - b.* Spire elevated, the alt. nearly equalling or exceeding the diam.
 - c.* Shell cylindrical, pupiform, *Phenacharopa.*
 - cc.* Shell convex-conoidal or thimble shaped, hairy, *Aeschrodomus.*
 - ccc.* Shell pyramidal-conic, spirally sculptured and pitted, not hairy, *Paratrochus.*
 - bb.* Spire depressed, convex, flat or concave ; diam. much exceeding the alt., *Charopa.*

Subgenus DIGLYPTUS Pilsbry, 1893.

Diaglyptus PILS., Manual viii, p. 86, not *Diaglypta* Færst., Verh. Ver. Rheinl. xxv, p. 176 (Insecta.)

? *Pitya* BECK, Index Molluscorum, p. 9, 1837 (name only), type *P. oparana* B. (undescribed).—MÆRCH, Catal. Yoldi, p. 6, 1852 (no description ; *H. bilamellata* Pfr. mentioned.)

Not *Pitya* PEASE, P. Z. S. 1871, p. 450.

Shell *elevated-trochiform*, rather narrowly but openly umbilicated, the two apical whorls spirally striated the remaining whorls strongly obliquely ribbed. Aperture armed with a strong entering parietal lamella, and two close columellar plicæ terminating in a large callous nodule on the columellar lip ; peristome expanded below. Type *Helix bilamellata* Pfr., = *pagodiformis*, pl. 5, fig. 54.

Anatomy unknown. The single species inhabits the island of Opara, one of the Austral group. It was doubtless derived from the

Endodonta stock, but the elevated contour and the aperture armature render it quite distinct in aspect.

E. pagodiformis Smith. viii, 86.

bilamellata Pfr. not Sowb.

? *oparana* Beck (undesc.)

Subgenus *LIBERA* Garrett, 1881.

Libera GRt., Journ. Acad. Nat. Sci. Phila. (2), viii, p. 390; ix, p. 33. Not "*Cephalopoda Libera*" DEHAAN, Monographiæ Ammoniteorum et Goniatiteorum, p. 18 (1825), which was not proposed as a generic name, and is in no sense such.

Shell depressed, widely umbilicated in the young, *the umbilicus strongly constricted in adults to form a pouch-like cavity*, in which the eggs are carried. Whorls 7-9, closely-coiled, the last generally angular. Aperture subrhombic, provided with folds within; lip thin, sharp; the columellar margin dilated, emarginate. Type *E. subcavernula*, pl. 5, figs. 45, 46, 47.

Animal small, ovoviviparous; eye peduncles long and slender, tentacles small; foot short, narrow, pointed behind.

Genitalia entirely simple, lacking all accessory organs (*L. bursatella*, *teste* Semp. Phil. Reise, p. 135.)

Jaw of *L. bursatella* distinctly striated, narrow, as if composed of fully 20 narrow lamellæ; entirely similar to that of *P. rotundata* Müll.

Radula consisting of 15-1-15 (*recedens*) to 10-7-1-7-10 (*tumuloïdes*) teeth. Centrals tricuspid. *Laterals lacking the entocones* or having it excessively small. Marginal teeth having a long bifid inner cusp (entocone plus mesocone) and a small ectocone (pl. 9, fig. 34, *E. recedens* Grt.; pl. 9, fig. 26, *E. tumuloïdes* Grt.)

The prominent feature of this radula is the lack of entocones on the lateral teeth. The jaw corresponds exactly with that of the typical Charopas. Semper has examined the animal of *bursatella*; Binney the teeth of *tumuloïdes*, and I have examined the radula of *recedens*.

This group is distinguished from *Endodonta* and other toothed Patuloids by the constriction of the umbilicus. The young (pl. 5, fig. 48, *E. fratercula* Pse.) contained in the umbilical pouch consist of about 1½ rounded, ventricose whorls, which are regularly and finely rib-striate, showing no trace of spiral striæ. The figure shows

the shell seen from above. The half grown shells are widely umbilicated, and resemble the normal *Endodonta*s in form and teeth.

This group also has descended from the *Endodonta* stock, being differentiated only by the constriction of the mouth of the umbilicus.

Garrett writes as follows. "Remarkable for their singular habit of ovipositing into the cavernous umbilicus. The eggs usually from four to six, or the same number of young shells, may frequently be seen closely packed in the cavity. The peculiar constriction of the umbilicus does not occur until the last two whorls are completed, previous to which it is very open or cup-shaped. Certain species more completely secure the safety of their eggs by the formation of a very thin shelly plate, which projects from the columellar and parietal region and nearly closes the umbilical opening. It is subsequently either broken away or absorbed by the animal to facilitate the escape of the young shells. All the species are gregarious, living under loose stones, rotten wood, and less frequently buried in decaying leaves. They range from the low lands near the sea-shore to upwards of two thousand feet above sea-level. So far as known, the genus, which comprises about a dozen species, is peculiar to the Society and Cook's Islands. In the former group they are confined to Tahiti and Moorea."

E. cavernula H. & J. iii, 69.

E. sculptilis Pse. iii, 70.

fratercula Pse.

E. subcavernula Tryon, iii, 70.

cavernula Garr. not H. & J.

E. tumuloides Garr. iii, 70.

E. jacquinoti Pfr. iii, 71.

excavata H. & J.

E. coarctata Pfr. iii, 71.

turricula H. & J.

streptaxon Ry.

E. bursatella Gld. iii, 71.

E. retunsa Pse. iii, 71.

E. heyneimanni Pfr. iii, 72.

E. gregaria Garr. iii, 72.

E. recedens Garr. iii, 72.

Subgenus ENDODONTA Albers.

Shell more or less depressed, varying from rounded to acutely keeled at the periphery, umbilicus generally open, rarely minute or closed, and never contracted at its opening. *Aperture armed within with teeth or entering plates* (rarely absent by degeneration).

This group comprises a great number of species, and is especially characteristic of the Polynesian fauna, although a few forms are found as far to the west as New Zealand, New Caledonia and the Philippine Islands. The species are unequally related, as is usually the case in large groups; and several minor divisions (*Thaumato-*

don, *Ptychodon*, *Helenoconcha*) have received names. These divisions or "sections" are of doubtful value, as they are practically undiagnosable; but still they are natural groups of species, and as such have their uses.

Sections of Endodonta.

- a.* St. Helena forms *Helenoconcha.*
- aa.* Australo-Polynesian forms
 - b.* Shell acutely keeled; teeth generally large, rarely wanting *Endodonta s. s.*
 - bb.* Shell rounded at periphery
 - c.* parietal wall with one or many liræ, outer lip toothless *Nesophila.*
 - cc.* outer lip toothed or lirate; parietal wall generally toothed *Ptychodon*, *Thaumaton.*

Section Endodonta s. str.

Shell openly or widely umbilicated, depressed, carinated, opaque; aperture obstructed by internal lamellæ, of which there are one or two on the parietal wall and several on the basal wall (but in *E. fabrefacta* lamellæ are absent). Type *E. lamellosa* Fér., pl. 4, figs. 40, 41. (see also *E. obolus* Gld., pl. 4, fig. 39; and *E. fabrefacta* Pse., pl. 5, figs. 52, 53).

Radula having 12-6-1-6-12 teeth. Centrals square, tricuspid; laterals of the same size as the centrals, bicuspid, the entocone being absent. Marginal teeth having a long bifid inner cusp and a short bifid ectocone (Pl. 9, fig. 22, *E. huaheimensis* Pfr.).

Sandwich Island species.

- | | |
|------------------------------------|-----------------------------------|
| <i>E. apiculata</i> Anc. viii, 95. | <i>E. lamellosa</i> Fér. iii, 67. |
| <i>E. binaria</i> Pfr. iii, 61. | <i>E. laminata</i> Pse. |
| <i>E. fricki</i> Pfr. iii, 67. | <i>E. rugata</i> Pse. iii, 67. |

Society Island species.

- | | |
|------------------------------------|--------------------------------|
| <i>E. cretacea</i> Grt. iii, 66. | <i>E. obolus</i> Gld. iii, 61. |
| <i>E. fabrefacta</i> Pse. iii, 45. | <i>acetabulum</i> Pse. |
| <i>conicava</i> Mouss., Schm. | <i>celsa</i> Pse. |
| <i>v. picea</i> Grt. | <i>barffii</i> Grt. |
| <i>E. ficta</i> Pse. iii, 62. | <i>intermixta</i> Mouss. |
| <i>E. garrettii</i> Anc. viii, 95. | |

- | | |
|-------------------------------------|-------------------------------|
| <i>E. huaheinesis</i> Pfr. iii, 61. | <i>E. taneæ</i> Grt. iii, 62. |
| <i>arana</i> Behn. | <i>janeæ</i> Schm. & Pfr. |
| | <i>boraborensis</i> Pse. ms. |

Pelew Island species.

- | | |
|---------------------------------------|--------------------------------------|
| <i>E. constricta</i> Semp. iii, 67. | <i>E. kororensis</i> Bedd. viii, 84. |
| <i>E. fuscozonata</i> Bedd. viii, 83. | <i>E. lacerata</i> Semp. iii, 67. |
| <i>E. irregularis</i> Semp. iii, 67. | |

Section *Thaumatodon* Pilsbry, 1893.

*Pity*s PEASE, P. Z. S., 1871, p. 450 (in part).—GARRETT, Journ. Acad. Nat. Sci. Phila. viii, p. 388 (1881). Not *Pity*s Beck, Index Molluscorum p. 9 (1837).

Shell discoidal, the spire low, convex; umbilicus open or closed; periphery generally broadly rounded; surface rib-striate, unicolored or flammulate. *Aperture having internal teeth or folds upon the outer wall, and the parietal wall, sometimes lacking upon the latter.* (Pl. 4, figs. 35, 36, 37, 38, *E. multilamellata* Grt. See also pl. 4, figs. 33, 34, *E. derbesiana* Cr.).

In *E. multilamellata* Grt. the lamellæ within the outer lip exhibit a peculiar structure; at frequent intervals they bear long curved hook-like processes, directed toward the aperture as shown in pl. 4, fig. 38. This structure is well adapted to prevent the entrance of insect enemies of the snail. No similar formation has been described in other land snails, except in the genus *Strobilops*; but in that group the processes are upon the parietal lamellæ only, while in *Thaumatodon* the palatal lamellæ alone are armed.

Polynesian species.

- | | |
|--|---|
| <i>E. acuticosta</i> Mouss. iii, 60. | <i>E. marquesana</i> Grt. viii, 96. |
| <i>E. analogica</i> Pse. iii, 63. | <i>E. maupiensis</i> Grt. iii, 65. |
| <i>E. anceyana</i> Grt. viii, 96. | <i>maupitiensis</i> Pfr. |
| <i>E. baldwini</i> Anc. | <i>E. multilamellata</i> Grt. iii, 63. |
| <i>v. albina</i> Anc. | <i>E. octolamellata</i> Grt. viii, 95. |
| <i>E. boraborensis</i> Grt. iii, 66. | <i>E. opanica</i> Ant. iii, 67. |
| <i>E. consimilis</i> Pse. iii, 60. | <i>oparica</i> auct. iii, 67. |
| <i>societatus</i> Mouss., Schm. | <i>E. parvideus</i> Pse. iii, 64. |
| <i>E. consobrina</i> Grt. iii, 66. | <i>incerta</i> Mouss., Pfr. |
| <i>E. contorta</i> Fér. iii, 63. | <i>E. paucicostata</i> Pse. iii, 60. |
| <i>intercarinata</i> Migh. | <i>E. punctiperforata</i> Grt. iii, 66. |
| <i>E. decemplicata</i> Mouss. iii, 63. | <i>E. radiella</i> Pfr. iii, 38. |

- | | |
|--------------------------------------|--------------------------------|
| E. decussatula Pse. iii, 60. | <i>pardalina</i> Dh. |
| E. dædalea Gld. iii, 64. | <i>undulata</i> Fér. |
| E. degagei Grt. iii, 65. | E. raratongensis Pse. iii, 64. |
| E. distans Pse. iii, 60. | E. rotellina Pse. iii, 60. |
| E. elisæ Anc. viii, 95. | E. rubiginosa Gld. iii, 59. |
| E. filocostata Pse. iii, 60. | E. rurutuensis Grt. iii, 61. |
| E. graffei Mouss. iii, 65. | E. sexlamellata Pfr. iii, 63. |
| E. hamyana Anc., viii, 95. | E. stellula Gld. iii, 61. |
| E. hystricelloides Mouss. iii, 65. | E. subdædalea Mouss. iii, 64. |
| E. hystrix Migh. iii, 59. | E. subtilis Grt. iii, 66. |
| <i>setigera</i> Gld. ms. | E. tiara Migh. iii, 38. |
| E. imperforata Pse. iii, 68. | E. unilamellata Grt. iii, 60. |
| <i>aitutakiana</i> Mouss., Schmeltz. | E. verecunda Pse. iii, 63. |
| E. jugosa Migh. iii, 59. | E. woapoensis Grt. viii, 95. |
| E. lamellicosta Grt. | E. zebrina Grt. iii, 64. |

Species of New Zealand, New Caledonia, Tasmania and Philippine Islands.

- | | |
|--------------------------------|-----------------------------------|
| E. berlieri Cr. iii, 59. | E. philippinensis Semp. viii, 82. |
| E. cryptobidens Sut. viii, 85. | E. timandra Hutt. viii, 84. |
| E. derbesiana Cr. iii, 63. | E. varicosa Pfr. iii, 23. |
| E. dispar Braz. iii, 59. | E. vincentina Cr. iii, 59. |
| E. jessica Hutt. viii, 85. | |

Section *Nesophila* Pilsbry, 1893.

Shell discoidal with open umbilicus, rounded periphery and depressed spire; surface generally ribbed, unicolored or flammulate. Aperture round-lunar, the parietal wall sculptured with one or many spiral entering liræ; outer wall toothless. Type *H. tiara* Migh., pl. 6, fig. 66.

The species are Polynesian in distribution. See list under *Thaumatodon*, in which they are included.

Section *Ptychodon* Ancey, 1889.

Ptychodon ANC., Bull. Soc. Mal. Fr. v. p. 372.—HEDLEY & SUTER, Proc. Linn. Soc. N. S. Wales (2) vii, p. 652.—*Maoriana* SUTER, Trans. N. Z. Inst. xxiii, p. 96.—PILSBRY, Manual, viii, p. 87.—*Strobila* HUTTON, olim, not of Morse.—*Huttonella* SUTER, Tr. N. Z. Inst. 1890, not of Pfr., 1855.

Shell umbilicated, discoidal, with low-convex spire, rounded periphery and rib-striated surface. Aperture crescentic, subvertical; outer lip thin, simple, armed a short distance within with numerous low folds; columellar lip bearing one or two larger entering lamellæ, and parietal wall bearing one or two stout entering plates, sometimes emarginate, or several smaller folds. Type *E. leioda* Hutton. (Pl. 4, figs. 30, 31, 32, *E. aorangi* Sut.).

Jaw membranaceous, slightly arcuate, with distant vertical striæ (pl. 8, fig. 6, *E. microundulata*).

Radula consisting of 90–100 slightly sinuous transverse rows of teeth, the formula varying from 6–4–1–4–6 (*wairarapa*) to 10–7–1–7–10 (*aorangi*). Central tooth tricuspid. Lateral teeth similar, tricuspid. Marginal teeth tricuspid or quadricuspid, the cusps showing a tendency to coalesce on the outer ones (Pl. 8, fig. 5, *E. microundulata*).

This group is closely allied to the Polynesian section *Thaumatonodon*. The species live under bark and rotten wood, in the bush. Our knowledge of them is due to Professor F. W. Hutton and Mr. H. Suter.

<i>E. leioda</i> Hutt. viii, 87.	<i>E. hectori</i> Sut. viii, 89.
<i>E. pseudoleioda</i> Sut. viii, 88.	<i>magdalenæ</i> Anc.
<i>E. wairarapa</i> Sut. viii, 88.	<i>E. aorangi</i> Sut. viii, 90.
<i>E. microundulata</i> Sut. viii, 89.	<i>E. hunuaensis</i> Sut.

Section *Helenoconcha* Pilsbry, 1892.

Manual of Conch. (2), viii, p. 91.

Shell discoidal, umbilicated; aperture armed within with small folds. Type *H. polyodon* Sowb., pl. 4, figs. 42, 43. Distribution, St. Helena.

Soft parts unknown. This group is distinguished from *Thaumatonodon* mainly on account of its different distribution. Its generic relationships cannot be affirmed with certainty until the soft parts are examined. It is not improbable that the species of *Patula* described from St. Helena are toothless forms of this group.

<i>E. polyodon</i> Sowb. viii, 93.	<i>E. pseustes</i> Sm. viii, 92.
<i>alexandri</i> Fbs.	<i>E. biplicata</i> Sowb. viii, 92.
<i>helenensis</i> Pfr.	<i>E. vernoni</i> Sm. viii, 91.
<i>E. minutissima</i> Sm. viii, 94.	<i>E. bilamellata</i> Sowb. viii, 91.
<i>E. leptalea</i> Sm. viii, 95.	v. <i>unilamellata</i> Sm. viii, 91.
<i>E. cutteri</i> Pfr. viii, 93.	

Subgenus BRAZIERIA Ancey, 1887.

Brazieria ANCEY, Conch. Exch. ii, p. 22, August, 1887. Not *Brazieria* Petterd, Proc. Roy. Soc. Tasman. for 1888, p. 76 (*Ammnicolidæ*).

Shell depressed, narrowly but openly umbilicated, ribbed above, smooth and *shining beneath*. Whorls $4\frac{1}{2}$ –5, the earlier $1\frac{1}{2}$ *reticulated* (fig. 51), the last strongly keeled. Aperture securiform, *lacking internal lamellæ*. Peristome thickened within, obtuse, *the parietal callus elevated into an erect tongue-like transverse process*. Type *H. velata* Hombr. & Jacq., pl. 5, figs. 49, 50, 51.

Soft parts unknown. The specimens before me were collected by Mr. John Brazier at Lugunur, one of the Caroline Islands. He found it also at Hagolu, Carolines, whence Hombron and Jacquinot procured it. We cannot regard the generic relationships of this snail as established until the soft parts are investigated; it may prove to belong to *Zonitidæ*. The elevated parietal tooth is formed on the plan of that of *Polygyra cereolus*, etc.

E. velata H. & J. iii, 61.

Subgenus PHENACHAROPE Pilsbry, 1893.

Tesseraria BTG., in v. Martens' Conchol. Mittheil., i, p. 69 (1881).—HEDLEY & SUTER, Proc. Linn. Soc. N. S. Wales (2), vii, p. 660, 1892. Not *Tesseraria* Hæckel, Das System der Medusen, in Denkschr. Med.-Naturwissensch. Gesellsch. zu Jena i, p. 633 (1879 or 1880).—*Pupa* sp., PFR., *et al.*

Shell pupiform, cylindrical, the altitude nearly double the diameter; apical end obtusely rounded; base slightly wider, convex, narrowly perforated. Surface ribbed and maculated as in *Charopa s. str.* Aperture subvertical, higher than wide, toothless; peristome simple, thin, the columellar margin dilated. Type *Pupa novoseelandica* Pfr., pl. 6, fig. 60.

Jaw arcuate, ends blunt with distant vertical striæ; upper margin slightly denticulated; a blunt median projection on the cutting edge (pl. 8, fig. 2).

Radula consisting of about 90 straight transverse rows of 11–5–1–5–11 teeth. Central tooth tricuspid. Lateral teeth larger, similar to the centrals, but slightly asymmetrical and with longer mesocones. Marginals broad, the 6th to 12th tricuspid, the mesocone largest; 13th to 15th with four cusps, the ectocone being split, mesocone still longest; last marginal with one broad low cutting point (pl. 8, fig. 1).

To Mr. H. Suter, is due our knowledge of the dentition and jaw of this peculiar shell, as well as the determination of its systematic position. Anatomically it presents no divergence from the typical *Charopas*, but the elevated pupiform shell resembles *Pupa* far more than *Charopa*.

E. novoseelandica Pfr. ix, pl. 6, f. 60. New Zealand.

Pupa neozelanica auct.

Subgenus *ÆSCHRODOMUS* Pilsbry, 1892.

Æschrodomus PILS., Nautilus, vi, p. 55, footnote (Sept. 5, 1892), — *Thera* HUTTON, Trans. N. Z. Inst., xvi, p. 193. Not *Thera* Stephens, 1831.

Shell *elevated, dome-shaped*, the altitude about equal to the diameter. Whorls rather narrow, the apical $1\frac{1}{2}$ forming a light colored spirally striated distinct embryonal shell; the lower whorls sculptured with oblique lamellar riblets which bear hairs where they cross the angular periphery; base flattened; umbilicus small but open. Aperture toothless, the peristome thin, simple. Type *E. stipulata* Rv., pl. 6, figs. 67, 68.

Animal (of *E. stipulata*) like that of *Charopa coma*; mantle subcentral, slightly reflected over the peristome; eye peduncles long and cylindrical; tail short, pointed, and with no mucous gland.

Jaw thin and delicate, but little arched, broadly and faintly vertically striated, sometimes showing a line of reinforcement parallel to the cutting edge (pl. 8, fig. 4, *E. barbatula*).

Radula consisting of about 100 almost straight transverse rows of teeth, the formula varying from 9-3-1-3-9, 10-4-1-4-10 or 10-6-1-6-10 (in *stipulata*) to 15-1-15 (in *barbatula*). Central teeth tricuspid, the mesocone attaining the anterior margin of the basal plate or shorter. Laterals similar but with longer mesocones. Inner marginals tricuspid, the outer quadricuspid by splitting of the ectocone; the outermost having one broad low cusp (pl. 8, fig. 3, *E. barbatula* Rv.).

This group differs from typical *Charopa* in its elevated, thimble-like contour, and the peripheral fringe of hairs borne by the riblets. Both of the species are from New Zealand.

E. stipulata Rve. iii, 94.

alpha Pfr.

E. barbatula Rve. iii, 95.

beta Pfr.

Subgenus PARATROCHUS Pilsbry, 1893.

Paratrochus PILS., Manual viii, p. 295.

Shell high-conic, having numerous ($8\frac{1}{2}$) whorls; narrowly umbilicated and well sculptured. Aperture nearly round, the peristome continued in a thin callus across the parietal wall. Type *H. dalbertisi* Braz., pl. 6, figs. 55, 56.

Soft parts unknown. The single species is from Yule Island, British New Guinea.

E. dalbertisi Brazier. viii, 295.

Subgenus CHAROPA Albers, 1860.

Shell depressed, umbilicated, discoidal or subdiscoidal. Aperture toothless; lip thin and simple.

This subgenus differs from *Nesophila* in entirely lacking spirally entering liræ upon the parietal wall. It is likely that some of the species included herein have descended from toothed forms; although the toothless Charopas are doubtless nearer than the toothed types to the ancestral form of the genus *Endodonta*.

Sections of Charopa.

a. Shell ribbed or rib-striate, Patuloid; whorls rounded,

Charopa s. s.

aa. Shell often hairy or shaggy; whorls keeled,

Acanthoptyx, Tropidotropis, Pterotropis.

Section *Charopa* Albers, s. str.

Charopa ALB., Die Hel. (edit. 2), p. 87, type *H. coma* Gray.—ANCEY, Bull. Soc. Mal. Fr. v, p. 364.—PILSBRY, Manual viii, p. 96.—HEDLEY, Proc. Linn. Soc. N. S. Wales (2) vii, p. 157.—*Simplicaria* MOUSS. MS., Suter, Tr. N. Z. Inst. xxiii, p. 90.

Shell depressed, subdiscoidal, the spire varying from convex to concave; openly umbilicated; whorls rather cylindrical, the last rounded or subangular (never keeled) at the periphery. Surface sculptured with oblique or sigmoid rib-striae; unicolored or painted with radiating reddish flames. Aperture lunate, oblique, the lip thin and simple, more or less sinuous; parietal wall covered by a varnish of callus, the riblets being removed by absorption. Type *E. coma* Gray, pl. 6, figs. 57, 58, 59 (pl. 6, figs. 63, 64, 65, *E. tapirina*.)

Animal small, the mantle rather posterior, tail not produced behind the shell. Eye peduncles large, club-shaped, approximated at their bases; tentacles short. Foot margined by a parapodial groove.

Jaw delicate, thin, more or less arcuate, sculptured with fine spaced subvertical striæ (pl. 9, fig. 24, *E. coma*; pl. 9, fig. 21, *E. sylvia*=*buccinella*.)

Radula having the teeth in somewhat sinuous transverse rows. Central tooth tricuspid, the mesocone reaching about to the anterior border of the basal-plate, side cusps small. Laterals similar but somewhat asymmetrical, the entocone becoming larger outwardly until it becomes joined at the base with the mesocone. The marginals are very low and wide, by shortening of the basal-plates; tricuspid, the ento- and mesocone often joined at base; ectocone smaller, simple or split into two. Cusps variously degenerate on the outermost marginals (pl. 9, fig. 23, *E. coma*; pl. 9, fig. 20, *E. sylvia*=*buccinella*.)

In some species, such as *E. dispersa* Gassies, the entocone remains minute upon all of the lateral teeth; and in some the ectocone splits on the marginals; but otherwise the dentition of the species does not differ from that of *E. coma*.

The shell is like *Goniodiscus* in being umbilicated, depressed, rib-striate; whorls tubular, aperture round-lunar or crescentic. It differs from *Goniodiscus* in the tendency of the upper lip to recede toward its insertion, forming a Pleurótomoid sinus or notch between outer lip and body-whorl; and in the more or less depressed (sometimes concave) inner whorls.

The species are very numerous, and they occupy a vast territory; but New Zealand, New Caledonia, and Australia with Tasmania are their especial home.

New Zealand species.

<i>E. anguiculus</i> Rv. iii, 23.	<i>E. huttoni</i> Sut. viii, 104.
<i>theta</i> Pfr.	<i>E. infecta</i> Rv. iii, 23.
<i>E. bianca</i> Hutt. viii, 97.	<i>zeta</i> Pfr.
v. <i>montana</i> Sut.	v. <i>irregularis</i> Sut. viii, 98.
<i>E. biconcava</i> Pfr. i, 130; viii, 104.	v. <i>alpestris</i> Sut. viii, 99.
<i>E. brouni</i> Sut. viii, 102.	<i>E. lucetta</i> Hutt. iii, 22.
<i>E. buccinella</i> Rv. iii, 23.	<i>stokesi</i> Sm. iii, 262.
<i>gamma</i> Pfr.	<i>E. moussoni</i> Sut. viii, 105.
<i>sylvia</i> Hutt. viii, 98.	<i>E. mutabilis</i> Sut. viii, 101.

- | | |
|-------------------------------|---------------------------------------|
| E. caputspinulæ Rv. iii, 102. | E. pseudocoma Sut. |
| <i>epsilon</i> Pfr. | E. raricostata Sut. viii, 100. |
| E. colensoi Sut. viii, 99. | E. segregata Sut. |
| E. coma Gray, iii, 22. | E. serpentinula Sut. viii, 103. |
| v. beta Pfr. | E. sterkiana Sut. viii, 101. |
| v. globosa Sut. viii, 96. | v. major Sut. |
| E. corniculum Rv. iii, 24. | v. reeftonensis Sut. |
| <i>eta</i> Pfr. | E. subantialba Sut. viii, 104. |
| v. maculata Sut. viii, 96. | E. tapirina Hutt. iii, 23 ; viii, 97. |
| E. egesta Gray, iii, 23. | E. tau Pfr. |
| E. eremita Sut. viii, 103. | E. variecostata Sut. viii, 100. |

New Caledonian species.

- | | |
|--------------------------------|---------------------------------|
| E. alveolus Gass. | E. melitæ Gass. iii, 45. |
| E. bazini Cr. i, 121. | E. morosula Gass. |
| E. calliope Cr. iii, 36. | E. noumeensis Cr. |
| E. confinis Gass. iii, 35. | E. ostiolum Cr. |
| E. costulifera Pfr. i, 120. | E. pinicola Pfr. i, 121. |
| v. major Cr. | E. rhizophorarum Gass. iii, 36. |
| E. decreta Gass. iii, 26. | E. rusticula Gass. iii, 26. |
| E. dispersa Gass. iii, 45. | E. saburra Gass. |
| E. inculta Gass. iii, 26. | E. subcoacta Gass. iii, 26. |
| E. kanakina Gass. i, 122. | E. subtersa Gass. iii, 35. |
| E. koutoumensis Gass. | E. taslei Cr. iii, 36. |
| E. lamberti Cr. iii, 26. | E. vetula Gass. iii, 36. |
| E. melaleucarum Gass. iii, 26. | |

Species of Lord Howe and Norfolk Is.

- | | |
|--------------------------------|---------------------------------|
| E. depsta Cox, iii, 46. | E. whiteleggei Braz. viii, 106. |
| E. exagitans Cox, iii, 46. | v. balli Braz. viii, 107. |
| E. unuini Braz. viii, 106. | v. ledgbirdi Braz. viii, 107. |
| E. wilkinsoni Braz. viii, 105. | |

Species of Australia and Tasmania.

[The following synonymic list was furnished by my valued correspondent and friend, CHARLES HEDLEY, of Sydney, N. S. W.]

- | | |
|--------------------------|--------------------------------|
| E. agnewi Cox, iii, 263. | E. microscopica Cox. |
| <i>petterdi</i> Brazier. | <i>microcosmos</i> Cox. |
| var. peroni Brazier. | E. millestriata Smith, i, 130. |

- E. albanensis* Cox, ii, 209; viii,
 [pl. 37, f. 43-46.
eastbournensis Beddome &
 [Petterd.
petterdiana Taylor.
 var. *stanleyensis* Petterd.
 var. *albida* Taylor.
E. antialba Beddome viii, 107.
E. barrenensis Petterd.
E. belli Cox, iii, 25.
E. biretracta Mousson, ii, 208.
E. bischoffensis Beddome, viii,
 [109.
E. brazieri Cox, iii, 24.
E. cochlidium Cox, iii, 25.
E. corticicola Cox.
E. cupera Cox, iii, 24.
nupera Brazier.
E. curacœ Brazier.
ramsgatensis Cox, iii, 265.
E. cygnea Benson, ii, 213.
E. diemenensis Cox, iii, 24.
thomsoni Cox.
daveyensis Cox, iii, 265.
atkinsoni Cox, iii, 266.
camille Cox.
wellingtonensis Cox.
midsoni Brazier.
E. funerea Cox, ii, 209.
E. furneauxensis Petterd.
E. gadensis Beddome viii, 109.
E. halli Cox.
E. hookeriana Johnston.
E. iuloidea Forbes ii, 209.
omieron Pfeiffer.
ammonitoides Reeve.
legrandi Cox, ii, 209.
ricei Brazier.
onslowi Brazier.
E. kershawi Petterd.
- E. mimosa* Petterd.
E. mucoides Tenison-Woods. iii, 44.
E. murphyi Cox, iii, 46.
E. murrayana Pfeiffer.
E. nautiloides Cox.
inusta Cox, ii, 209.
E. neglecta Brazier.
luckmani Brazier.
 var. *siliens* Cox.
 var. *jungermaniæ* Petterd.
 var. *trucanini* Petterd.
E. officieri Cox, iii, 266.
E. otwayensis Petterd.
 var. *alpina* Johnston.
E. paradoxa Cox.
morti Cox, iii, 34.
hobarti Cox, iii, 34.
arenicola Tate, iii, 52.
E. pexa Cox, iii, 25.
E. retepora Cox, iii, 34.
E. reteporoides Tate, viii, 110.
E. roblini Petterd.
E. rotella Brazier.
E. saturni Cox, iii, 24.
E. sericatulæ Pfeiffer, ii, 208.
melbournensis Cox, iii, 35.
E. spaldingi Brazier.
 var. *carinata* Brazier.
E. parvissima Cox.
E. spiceri Petterd.
E. spectra Cox, iii, 266.
architectonica Brazier.
gunni Brazier.
assimilis Brazier.
E. similis Cox.
stellata Brazier, iii, 34.
derelicta Cox.
E. stroudensis Cox, iii, 25.
E. subdepressa Brazier.
dandenongensis Petterd.

- | | |
|-------------------------------------|------------------------------|
| E. limula Cox. | E. sublesta Benson. |
| E. lottah Petterd. | E. subrugosa Brazier. |
| E. macdonaldi Cox. | E. tamarensis Petterd. |
| <i>kingstonensis</i> Cox, iii, 266. | E. tasmaniae Cox, iii, 34. |
| <i>gouldi</i> Cox. | E. vigens Cox, iii, 263. |
| <i>juliformis</i> Cox, iii, 263. | <i>ammonitoides</i> Brazier. |
| E. marchianae Cox. | <i>bassi</i> Brazier. |
| <i>fuscoradiata</i> Cox, iii, 265. | E. vinitincta Cox, i, 115. |
| E. mathinae Petterd. | |

* * *

E. lizardensis Pfr. iii, 86.

New Guinea, Aru and Tenimber Is. species.

- | | |
|----------------------------------|-----------------------------|
| E. brunnescens Mlldff. viii, 82. | E. texta Hedley. viii, 294. |
| E. demani Tap.-Can. iii, 26. | |

Polynesian species.

- | | |
|-----------------------------------|-------------------------------------|
| E. adposita Mouss. iii, 41. | <i>vicaria</i> Mouss. |
| E. canalis Grt. iii, 39. | <i>v. vicinalis</i> Mouss. iii, 39. |
| E. complementaria Mouss. iii, 40. | E. monstrosa Anc. viii, 82. |
| E. decorticata Grt. iii, 40. | <i>irregularis</i> Mouss. not Semp. |
| v. otareae Grt. | E. oualanensis Pse. iii, 41. |
| E. filiola Fér. iii, 38. | E. planospira Grt. iii, 41. |
| E. glissoni Anc. viii, 82. | E. princei Liard. iii, 27. |
| E. harveyensis Grt. iii, 40. | E. proxima Grt. iii, 39. |
| E. helva Cox, iii, 262. | E. radicalis Mouss. |
| E. ignava Pfr. iii, 36. | E. rotula Hombr. iii, 67. |
| E. inermis Mouss. iii, 41. | E. rudis Grt. iii, 39. |
| E. lamellicostata Grt. iii, 39. | ? <i>sublaminata</i> Mss, Schm. |
| E. modicella Fér. iii, 38. | E. tenuicostata Grt. iii, 39. |
| v. atiensis Pse. | E. youngi Grt. iii, 40. |

Section *Acanthoptyx* Ancey, 1888.

Acanthoptyx ANCEY, Bull. Soc. Mal. France, v, p. 370.

Shell *discoïdal*, *thin*, openly umbilicated; *whorls* few (3-4) and rapidly increasing, sculptured with fine close lamellar striæ and unevenly spaced *elevated ribs*, rising into lamellæ as they cross the

subangular periphery. *Aperture large, oblique, toothless*; peristome fragile. Type *H. acanthinula* Crosse, pl. 6, figs. 71, 72, 73.

Jaw and soft parts not examined.

Dentition: centrals as wide as long, tricuspid, the mesocone attaining the anterior border of the basal-plate, side cusps small. Laterals similar. Marginal teeth low, wide, with the entocone and mesocone long, united at base, the ectocone split into three minute cusps (pl. 9, fig. 25, *E. acanthinula*.)

E. acanthinula Crosse. iii, 124. New Caledonia.

Section *Tropidotropis* Ancey.

Tropidotropis ANC., Bull. Soc. Mal. Fr. v, p. 370.

Shell broadly umbilicated, discoidal, the spire nearly flat; whorls flat above, the last acutely carinated; epidermis laciniate-lamellose. Aperture securiform, toothless, the peristome simple, acute. Type *H. trichocoma* Crosse, pl. 6, figs. 61, 62.

E. trichocoma Cr. iii, 45. New Caledonia.

Section *Pterodiscus* Pilsbry, 1893.

Tropidoptera ANC., Bull. Soc. Mal. Fr. vi, p. 191. Not *Tropidopterus* Blanch. 1845 (*Coleoptera*.)

Shell umbilicated, depressed, thin or fragile, horny brown. Whorls finely, densely striated, the last acutely keeled at the periphery, carinated around the umbilicus. Aperture oblique, toothless; lip thin and simple. Type *H. alata* Pfr., pl. 4, fig. 44.

Shells of this section have the appearance of the New Caledonian groups *Acanthoptyx* and *Tropidotropis*. The species are from the Sandwich Is.

E. alata Pfr.

E. depressiformis Pse.

E. prostrata Pse.

E. digonophora Anc.

Genus PHASIS Albers, 1850.

Phasis ALB., Die Hel., p. 92. Type and only species *H. menkeana* Pfr.—PILSBRY, Manual viii, p. 135.

Shell resembling *Xerophila*; depressed, umbilicated, solid, white and opaque, generally with brown bands or dots, the apex dark; last whorl not descending; aperture rounded-lunate, but little oblique;

lip thin, simple, *its columellar margin dilated*. Type *H. menkeana* Pfr., pl. 10, figs. 1, 2, 3.

Distribution, South Africa.

Under this genus as subgenera may be ranged two groups: *Trachycystis* and *Sculptaria*, both belonging to the S. African fauna. The anatomy of typical *Phasis* is unknown. That of *Trachycystis* is described below. The diagnosis given above applies to the restricted subgenus *Phasis* only, to which the following species belong:

<i>P. capensis</i> Pfr. iii, 103.	<i>P. namaquana</i> Mts. viii, 297.
<i>irrorata</i> Zieg.	<i>P. paludicola</i> Bens. iii, 104.
<i>littoricola</i> Bens.	<i>P. sturmiana</i> Pfr. vi, 317.
<i>P. menkeana</i> Pfr. iii, 108.	<i>P. uitenhagensis</i> Kr. iii, 104.

Subgenus TRACHYCYSTIS Pilsbry, 1892.

Trachycystis PILS., Man. of Conch. viii, p. 136.—*Pella* Alb. (in part), Die Hel. (2), p. 84, 1860. Not *Pella* Steph. 1832.

Shell small, *thin*, generally somewhat translucent, horny or earthy brown in color, usually sculptured with oblique riblets or rib-striae, the apical whorl spirally striated (fig. 7); aperture lunate; lip simple, thin, *dilated at the columellar insertion*. Type *P. bisculpta* Bens., pl. 10, figs. 5, 6, 7; see also *P. browningi* Bens. pl. 10, figs. 8, 9.

Animal (of *P. rariplicata*) having a rather long slender foot, the sole apparently undivided; foot-margins wide, not crenulated nor more coarsely granulated than the rest of the surface, defined by a pair of shallow grooves; tail lacking a mucous pore.

Jaw thin, having numerous flat plaits.

Radula having the transverse rows of teeth crowded, so that the cusps of one row project over the bases of the next. Central teeth tricuspid, the mesocone longer than the basal plate, slender, side cusps small. Lateral teeth altogether similar, but slightly asymmetrical, the entocones increasing in length outwardly. Transition from lateral to marginal teeth very gradual, the latter tricuspid, the ento- and mesocones subequal, long, oblique and united at their bases, the ectocone smaller, simple (in *P. bisculpta*) or bifid (*P. rariplicata*). Pl. 15, figs. 3, 4, *P. bisculpta*.

All of the teeth are tricuspid; the central and inner lateral teeth are so similar that it is difficult to distinguish which is the rhachidian row, and the mesocones are long and slender. The inner marginal teeth are remarkable for their long ento- and mesocones.

Binney has figured the teeth of *P. rariplicata*, but judging by the radula before me he makes the median teeth too short for their length. He correctly figures the ectocone of the outer marginals as bifid. The radula of *P. biscalpta* has not before been examined.

These shells are shaped like *Phasis* from which they differ in the thin texture and sculpture. Some species resemble the New Zealand group *Allodiscus* and others are like *Thysanophora* or *Patula*. All of them belong to the South African fauna, with the exception of a few species from Mauritius and adjacent islands, which present the same shell characters, but have hitherto been grouped in *Patula* or *Charopa*. The affinities of the genus are with the Charopoid Endodontas as far as present knowledge enables us to judge; and they are separated from that type mainly by their distribution and certain features of the teeth described above. The differences in the radula are, however, of but little importance.

- | | |
|---|---|
| <i>P. actinotricha</i> Melv. & Pons. | <i>P. microscopica</i> Kr. iii, 106. |
| | [viii, 143. <i>P. minythodes</i> Melv. & Pons. ^f |
| <i>P. ænea</i> Kr. iii, 105. | [viii, 144. |
| <i>P. aprica</i> Kr. iii, 107. | <i>P. newtoni</i> Nev. iii, 27. |
| <i>P. arachne</i> Morel. | <i>P. perplicata</i> Bens. iii, 106. |
| <i>P. aulacophora</i> Anc. viii, 138. | <i>P. petrobia</i> Bens. iii, 107. |
| <i>P. bathycoele</i> Melv. & Pons. viii, | <i>P. planti</i> Pfr. viii, 142. |
| | 139. <i>platti</i> Pfr. <i>olim</i> . |
| <i>P. biscalpta</i> Bens. iii, 105. | <i>v. africæ</i> Brn. viii, 142. |
| <i>P. brownigii</i> Bens. viii, 136. | <i>P. prionacis</i> Bens. viii, 137. |
| <i>P. burnupi</i> Melv. & Pons. viii, | <i>P. rariplicata</i> Bens. iii, 107. |
| | [140. <i>P. rhyodes</i> Melv. & Pons. viii, |
| <i>P. caldwelli</i> (Barel.) Bens. iii, 27. | [141. |
| <i>paulus</i> Mor. | <i>P. rivularis</i> Kr. iii, 107. |
| <i>P. conisalea</i> Melv. & Pons. viii, | <i>P. rodriguezensis</i> Cr. |
| | [145. <i>P. sabuletorum</i> Bens. iii, 107. |
| <i>P. crawfordi</i> Melv. & Pons. viii, | <i>P. somersetensis</i> Melv. & Pons. |
| | [146. [viii, 295. |
| <i>P. epetrima</i> Melv. & Pons. viii, | <i>P. strobilodes</i> Melv. & Pons. |
| | [146. [viii, 147. |
| <i>P. erateina</i> Melv. & Pons. viii, | <i>P. tabulæ</i> Chap. viii, 139. |
| | [137. <i>P. trichosteiroma</i> Melv. & Pons. |
| <i>P. farquhari</i> Melv. & Pons. viii, | [viii, 143. |
| | [147. <i>P. tuguriolum</i> Melv. & Pons. |
| <i>P. glanvilliana</i> Anc. viii, 147. | [viii, 145. |

- | | |
|------------------------------|--------------------------------|
| P. hottentota Melv. & Pons. | P. turmalis Morel. viii, 144. |
| [viii, 141. | P. viridescens Melv. & Pons. |
| P. inops Morel. viii, 144. | [viii, 78. |
| P. loricostata Melv. & Pons. | P. vorticialis Bens. iii, 107. |
| [viii, 140. | P. vorticella H. Ad. iii, 35. |
| P. loveni Kr. iii, 106. | P. zanguebarica Craven. |
| P. lygæa Melv. & Pons. viii, | |
| [138. | |

Subgenus ? SCULPTARIA Pfr., 1856.

Sculptaria PFR., Malak. Blätter ii, p. 135, type *H. sculpturata* Gray.

Shell small, discoidal, carinated, widely umbilicated; last whorl becoming free at the aperture; aperture very oblique, rounded, with continuous slightly expanded peristome, and having several teeth on the outer lip and an entering parietal lamina. Type *H. sculpturata* Gray, pl. 10, fig. 4.

Anatomy unknown. A group of problematic relationships, represented by a few species in southwestern Africa (Damaraland).

- | | |
|--------------------------------|-------------------------------|
| S. damarensis H. Ad. iii, 138. | S. chapmanni Anc. viii, 152. |
| S. sculpturata Gray, iii, 138. | S. reticulata Mts. viii, 152. |
| v. collaris Pfr. iii, 138. | |

Genus AMPHIDONA Albers, 1850.

Amphidoxa ALB., Die Hel. p. 110 (for *H. marmorella* and *helicophantoides*); Edit. Martens, p. 82.

Shell thin, depressed-globose or discoidal, perforated or umbilicated; aperture lunar-rounded or ovate; peristome simple, thin. Type *H. marmorella* Pfr., pl. 7, figs. 10, 11, 12.

Distribution: southwestern shore of South America and adjacent islands, Juan Fernandez, Chiloe, etc., Cape Horn region and Kerguelen Is.

These shells resemble some forms of the genera *Flammulina* and *Endodonta*; the typical *Amphidoxas* recalling *Flammulina* or *Calymna*, the *Stephanodas* being like *Allodiscus*, *Suteria* or *Charopa*. The anatomy of the South American forms is unknown, but that of *A. hookeri* of Kerguelen Island shows an affinity to *Charopa* in the possession of parapodial grooves. Two sections compose this group.

Section AMPHIDOKA Alb.

Shell small, perforate, depressed-globose, thin and pellucid, costulate-striate, Whorls 3-3½, rapidly enlarging. Aperture ample. Anatomy unknown. Distribution, Juan Fernandez.

A. marmorella Pfr. iii, 46.

A. helicophantoides Pfr. iii, 46.

Section STEPHANODA Albers, 1860.

Stephanoda ALB., Die Hel. (2) p. 88. Type *H. dissimilis* Orb. *Stephanoda* PFR., Nomencl., p. 93.

Shell umbilicated, thin, costulate, sometimes spirally striated; in shape like *Discus* or *Charopa*. Whorls 5-7, the last cylindrical, not descending. Aperture rounded lunar; lip thin, simple. Type *H. dissimilis* Orb., pl. 7, figs. 19, 20, 21. See also pl. 7, figs. 16, 17, 18, *A. hookeri* Reeve.)

Anatomy of the typical forms unknown; of *A. hookeri* as follows, the living animal according to Eaton's observations (Philos. Trans., 1879, p. 183), the internal anatomy according to Schako and Pfeffer (Monatsber. K.-P. Akad. Wissensch. Berlin, 1877, p. 269.)

Animal (in spirit) with a narrow foot, rather narrower posteriorly than in front. The sole of a pale livid olive, sides dark slate color. Mantle above the head pale livid, dotted with dark slate spots. During life the animal (viewed through a lens), is black, reticulated with gray; tentacles either black above and dark gray beneath longitudinally, or dark gray throughout. Foot bordered above by a ribbon-like stripe which is composed of long oblong tessellations whose interstices are gray, which is separated by a thin pale irregular line from the more finely reticulated upper portion of the sides and back. The interspaces of the reticulation of these last are slightly raised and black, and cause the surface to be somewhat granulated. Some of the lines of growth of the shell are occasionally straw color (*Eaton*). Sole tripartite, divided into areas by two longitudinal and many transverse grooves, the outer areas darkly pigmented. No appendages upon the mantle margin.

Genitalia simple, without accessory organs; vas deferens inserted at the apex of penis, passing gradually into it; spermatheca terminating in a short straight or bent appendage, and situated upon a rather long duct (pl. 1, fig. 16, *A. hookeri*.)

Jaw measuring .7 x .68 mill., rather narrow, low-arcuate, sculptured with fine, somewhat wavy transverse striæ and numerous nar-

row vertical grooves, which hardly crenulate the cutting edge. In young examples it seems as if composed of narrow plates held together by the underlying membrane (*Schako*). Pl. 1, fig. 15, *A. hookeri*.

Radula measuring 2.41 x .68 mill., consisting of 205 closely placed transverse rows, each with 35, 51, 57 or 65 teeth. Formula 25-11-1-11-25. Rhachidian tooth with a broad, blunt, rounded mesocone, no side cusps. Laterals similar, the cusp often extending beyond the thin basal-plate. Marginals tricuspid, the side cusps small but distinct, obsolete on the outer marginals (pl. 1, fig. 14, *A. hookeri*, showing teeth R, 1, 12, 17, 22, 25.)

The principal peculiarity of the radula is that the central and lateral teeth possess mesocones only, in this respect differing from the genera *Endodonta* and *Phasis*; but as the dentition of but one species is known, too much stress should not be laid upon this feature. The close alliance of the toothless *Endodontas* (*Charopa*), the S. African group *Trachycystis*, the northern genus *Pyramidula*, and the S. American *Amphidoxa-Stephanoda* series, is evident.

- | | |
|--|--|
| <i>A. arctispira</i> Pfr. iii, 47. | <i>A. lirata</i> Couth. iii, 42. |
| <i>A. binneyana</i> Pfr. iii, 48. | <i>A. magellanica</i> Sm. iii, 42. |
| <i>A. bryophila</i> Ph. iii, 42. | <i>A. musicola</i> Ph. iii, 43. |
| <i>A. ceroides</i> Pfr. iii, 47. | <i>A. ordinaria</i> Sm. |
| <i>A. chilensis</i> Mühlf. iii, 42. | <i>A. pazii</i> Ph. iii, 43. |
| <i>A. coiquecana</i> Ph. iii, 43. | <i>minviellei</i> Ph. |
| <i>A. coppingeri</i> Sm. iii, 42. | <i>A. pleurophora</i> Moric. iii, 53. |
| <i>A. corticaria</i> Ph. iii, 43. | <i>A. pusio</i> King, iii, 47. |
| <i>A. costellata</i> Orb. iii, 41. | <i>A. quadrata</i> Fér. iii, 47. |
| <i>A. dissimilis</i> Orb. iii, 48. | <i>kingi</i> Pfr. |
| <i>histris</i> Mühlf. | <i>A. rigophila</i> Mab. & Roch. viii, |
| <i>plugiata</i> Beck. | [81. |
| <i>A. epidermia</i> Ant. iii, 42. | <i>A. selkirki</i> Sm. iii, 47. |
| <i>A. exigua</i> Ph. iii, 43. | <i>A. spirillus</i> Gld. |
| <i>A. germaini</i> Ph. iii, 43. | <i>A. stelzneriana</i> Ph. iii, 43. |
| <i>A. gratioleti</i> Hupé, iii, 48. | <i>A. strobiliana</i> Ph. iii, 43. |
| <i>A. holmbergi</i> Dör. iii, 43. | <i>A. tenuistriata</i> Ph. iii, 48. |
| <i>A. hookeri</i> Rve. iii, 48. | <i>A. tessellata</i> Mühlf. iii, 47. |
| <i>A. hypophloeae</i> Ph. iii, 43. | <i>contortula</i> Fér. |
| <i>A. jungermanniarum</i> Ph. iii, 43. | <i>A. zebrina</i> Ph. iii, 48. |
| <i>A. leptotera</i> Mab. & Roch. viii, 81. | |

Genus PYRAMIDULA Fitzinger, 1833.

Pyramidula FITZ., Systematisches Verzeichniss der im Erzherzogthume Oesterreich vorkommenden Weichthiere, als Prodrum einer Fauna derselben, p. 95 (for *H. rupestris* Drap.)

+ *Gonyodiscus* and *Discus* FITZ., 1833; *Patula* HELD., 1837; *Delomphalus* Ag., 1837; *Eryomphala* Beck, 1837; etc., etc.

= *Patula* of most modern authors.

Shell openly umbilicated, varying in contour from flattened and disk-like to conoidal. Generally opaque, often rib-striate. Unicolored, spirally banded or flammulate. Whorls subcylindrical or keeled, the apex generally smooth. Aperture rounded-lunate; lip simple and thin. Type *P. rupestris* Drap.

Animal having the sole undivided; lateral margin of the foot with a distinct border bounded by a groove, the grooves meeting above the tail. No caudal mucous pore. Eye-peduncles long and slender (pl. 14, fig. 40, 46, *P. alternata*.)

Genital system lacking all accessory organs; vas deferens and retractor muscle inserted near or at the apex of the penis; duct of the spermatheca very long; hermaphrodite duct very long, but shortened by its extreme convolution (pl. 11.)

Jaw arcuate, its component laminae generally compactly soldered, and indicated only by fine striae which diverge slightly from the middle.

Radula (1) having only the mesocones developed upon central and inner lateral teeth, or (2) having the centrals tricuspid, laterals bicuspid lacking the entocones, marginal teeth similar but with short basal-plates; this being the usual form. In some species the marginal teeth are multicuspid by the splitting of their ectocones.

The dentition, as usual, shows considerable variation, even in species otherwise closely related. As a general rule, the lateral teeth completely lack entocones, differing in this respect from *Trachycystis* and the *Endodonta-Charopa* series; but in the section *Helicodiscus*, entocones are well developed. The dentition is quite unlike *Trachycystis* in the forms of the marginal teeth.

The genus *Pyramidula* consists of dull-colored ground-living snails, species of which occur over the whole northern temperate land area. Its nearest relatives are *Charopa*, *Trachycystis* and *Stephanoda*, genera occupying the southern temperate regions of Australasia, Africa and South America respectively. All may be regarded as the remnants of an early fauna, now replaced in the tropics, and to a large extent

in temperate regions also, by higher groups of Helices. The latter differ widely from these Patuloid genera in lacking parapodial grooves, in the solid, ribbed jaw, complex genital system, and other features to be described later.

In treating of the subgenus *Patula* it will be shown that that name is not available as a designation for the present genus as a whole. *Pyramidula* is the earliest name, and should be accepted. It may be objected that no diagnosis of *Pyramidula* was published by Fitzinger, but the same may be said of Beck's genera. Let those who repudiate Beck's names cast the first stone at Fitzinger!

Pyramidula is divisible into eight subordinate groups, which may be tabulated thus:

- a. Shell lacking internal teeth or folds,
 - b. Spire conical; size very small, shell thin, *Pyramidula s. s.*
- bb. Spire depressed,
 - c. Shell rather large and solid, *Patula.*
 - cc. Shell small or minute,
 - d. Surface spirally lamellate, *Lyrodiscus.*
 - dd. Body-whorl with 20-25 spaced oblique laminae, *Planogyra.*
 - ddd. Surface striate or rib-striate, *Gonyodiscus, Patulastra.*
- aa. Body-whorl having one or several pairs of internal teeth,
 - b. Internal teeth tubercular; surface spirally sculptured, *Helicodiscus.*
 - bb. Internal teeth lamellar; surface obliquely sculptured, *Atlantica.*

Besides these, another group, *Pupisoma*, has been referred provisionally to this genus.

Subgenus PYRAMIDULA Fitz.

Shell small, moderately or widely umbilicated, lacking internal folds or teeth.

The following sections may be grouped under this subgeneric head: *Pyramidula s. str.*, *Patulastra*, *Planogyra*, *Gonyodiscus* and *Lyrodiscus*.

Section *Pyramidula* Fitz., *s. str.*

Pyramidula FITZ., Syst. Verz., p. 95.

Shell minute, openly umbilicated, with pyramidal spire and obtuse

smooth apex. Whorls tubular, obliquely striated. Aperture round or nearly so; lip simple. Type *H. rupestris* Dr., pl. 10, figs. 15, 16.

Jaw arcuate, finely striated vertically.

Radula having the central teeth unicuspid, the side cusps being represented by a slight sinuation. Laterals bicuspid. Marginals with low wide basal-plate, the inner bearing two cusps, the outer becoming multicuspid by splitting of the cusps, (pl. 11, fig. 25, *P. rupestris* Dr.)

Distribution, Europe and Central Asia.

This section differs from *Gonyodiscus* and *Patulastra* in having the spire conically elevated, and from the former in lacking rib-striae.

<i>P. rupestris</i> Dr. iii, 51.	<i>f. dalmatina</i> Cl.
<i>umbilicata</i> Mont.	<i>f. pinii</i> Ad. iii, 51.
<i>aliena</i> Zieg.	<i>P. chorismenostoma</i> Bl. & West.
<i>spirula</i> Villa.	<i>P. hierosolymitana</i> Bgt. iii, 52.
<i>myrmecidis</i> Seac.	<i>P. humilis</i> Hutt. iii, 22.
<i>f. rupicola</i> Stab.	<i>P. orphana</i> Hde.
<i>f. saxatilis</i> Hm.	<i>P. euomphalus</i> Blf. iii, 32.
<i>f. subglobosa</i> Bgt.	<i>P. abbadiana</i> Bgt. iii, 52.
<i>f. conoidea</i> Bgt.	<i>P. brucei</i> Jick. iii, 52.
<i>f. meridionalis</i> Iss.	<i>P. amblygonia</i> Reinh. iii, 52.
<i>f. jænensis</i> Cl. iii, 51.	<i>P. lepta</i> West. viii, 81.

Section *Patulastra* Pfeiffer, 1878.

Patulastra PFR., Nomencl. Hel. Viv., p. 87.

Shell having the form of *Patula*, but minute, with fewer whorls, the surface unicolored, with or without riblets.

This section may be retained to include the minute forms similar in general characters of the shell to *Punctum*, but with the anatomical features of the genus *Pyramidula*. The limits of the group are uncertain, as part of the species might be placed in the sections *Gonyodiscus* or *Pyramidula*, and others are likely to prove *Punctums*. Of course the mélange included here by Pfeiffer and by Tryon must be assorted into many diverse groups.

<i>P. abyssinica</i> Jick. iii, 32.	<i>P. debeauxiana</i> Bgt. iii, 28.
<i>rivularis</i> Mts.	<i>P. carotae</i> Bgt. Serv. iii, 31.
<i>P. aranea</i> Parr. iii, 31.	<i>P. elachia</i> Bgt. iii, 28.
<i>P. aucapitainiana</i> Bgt. iii, 29.	<i>P. gallæciana</i> Silv.
<i>P. balatonica</i> Serv. iii, 31.]	<i>P. henriquesi</i> Silv.
<i>P. bussacona</i> Silv.	<i>P. lederi</i> Bttg. iii, 31.

- | | |
|--------------------------------------|-------------------------------------|
| <i>P. luseana</i> Paiv. iii, 31. | <i>P. pusilla</i> Lwe. iii, 31. |
| <i>P. massoti</i> Bgt. iii, 29. | <i>hypocrita</i> Dohrn. |
| <i>P. micropleuros</i> Pag. iii, 28. | <i>servilis</i> Sh. |
| <i>P. microstigmæa</i> Silv. | <i>P. servaini</i> Bgt. iii, 31. |
| <i>P. nemesiana</i> Bgt. iii, 31. | <i>P. simoniana</i> Bgt. iii, 31. |
| <i>P. pornæ</i> Serv. iii, 31. | <i>P. sororecula</i> Ben. iii, 29. |
| <i>P. poupillieri</i> Bgt. iii, 29. | <i>P. tenuicostata</i> Sh. iii, 28. |

Section *Planogyra* Morse, 1864.

Planogyra MORSE, Obs. Terrest. Pulm. Maine, p. 24, type *P. asteriscus* Mse.

Shell minute, discoidal, openly umbilicated, the spire flat. *Whorls bearing thin, sharp, spaced laminae*, parallel to growth-striae. Aperture rounded-lunar, lip simple. Type *P. asteriscus* Morse, pl. 10, figs. 10, 11.

Jaw slightly arcuate, bluntly rounded at the ends, irregularly vertically wrinkled, the concave margin having a slight median projection.

Radula consists of 77 transverse rows containing about 13.1.13 teeth. Centrals tricuspid. Laterals lacking the entocone. Marginal teeth multicuspid, the mesocone largest, bifid (pl. 11, fig. 21, *P. asteriscus* Morse).

The radula differs from that of *Pyramidula s. str.* only in the development of side cusps on the central tooth, and the shorter mesocone of the same. But one species is known; it is widely distributed in Canada and northern New England, living in very wet places.

Morse represents the eye-peduncles of this species as short, thick, and club-shaped (pl. 10, fig. 10); his observation should be checked by an examination of the living animal, as that form of eye stalk is widely different from the other *Pyramidula* species.

Section *Gonyodiscus* Fitzinger, 1833.

Gonyodiscus FITZ. Syst. Verz. p. 98, proposed for *G. perspectivus* Fitz.—*H. solaria* Mke.—*Discus* FITZ., Syst. Verz., p. 99; proposed for *H. rotundata*, *runderata*, *pygmæa*, *crystallina* (not *Discus* Less. 1837, nor of Hald. 1840, nor of Alb. 1850, nor of Campb. 1879).—*Patula* HELD, in part.—*Delomphalus* AGASSIZ, in CHARP., Catal. des Moll. Terrest. et Fluv. de la Suisse, p. 12, in Nouv. Mém. de la Soc. Helvétique des Sci. Nat. i, Neuchatel, 1837; proposed for *H. rotundata*, *runderata* *pygmæa*.—*Eryomphala* (in part) BECK, Index,

p. 8.—*Patularia* CLESSIN, Die Molluskenfauna Oesterreich-Ungarns und der Schweiz, p. 104 (proposed for *P. rotundata*, *hauffeni*, *runderata*, *solaria*, *pygmaea*).—*Spelæodiscus* BRUSINA, Mittheil, naturwissensch. Ver. Steiermark, 1885, p. 37, type, *H. hauffeni*. *Allerya* BOURGUIGNAT, Atti Ac. Palermo, 1876 (=embryonic shells of *H. rotundata*, etc.).

Shell rather small, depressed, with low but convex spire and open umbilicus. Apical $1\frac{1}{2}$ whorls smooth, the rest obliquely rib-striate, rather tubular, rounded or keeled at the periphery, unicolored or flamed with reddish. Aperture wide-lunate, the lip simple. Type *P. solaria* Mke., pl. 10, fig. 14. See also pl. 10, figs. 12, 13, *P. rotundata* Müll.

Animal (of *P. perspectiva* Say) long and narrow, the foot white, head and back dusky blue. Sole equal in length to the diameter of the shell, undivided (having a central longitudinal sulcus when entering the shell or in alcohol); margins of foot having a wide border, bounded by a distinct groove, the grooves meeting above the tail. Upper surface coarsely granulated. Eye peduncles long and slender, from one-third to one-half as long as the foot (pl. 14, fig. 45).

Genital system lacking all accessory organs. The penis is short, having the retractor and the vas deferens inserted at its apex. Spermatheca small, situated upon a very long simple duct, which enters the vagina very low. At the base of the albumen gland there is a rather large talon. The albumen gland is small and adherent to the lower part of the hermaphrodite duct; the latter being large and very much convoluted (pl. 11, fig. 22, *P. perspectiva*).

The genital system of *P. rotundata* as figured by Lehmann is similar. Leidy's figure of that of *perspectiva* is incorrect in showing an appendicula.

Jaw arcuate, with a slight median projection, finely striated, the striae subvertical, diverging below toward the outer basal angles of the jaw (pl. 11, fig. 19, *P. perspectiva*). The jaw of *rotundata*, according to Lehmann and Moquin-Tandon, has fewer, more spaced striae than I have found in *P. perspectiva*. That of *P. balmei* (pl. 15, fig. 2) is very distinctly and closely striated, and differs from the jaw of *perspectiva* in being incompletely soldered, the edges of the component vertical plates being slightly free, as in some charopoid snails.

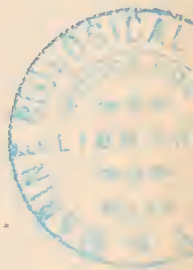
Radula bearing crowded teeth (in *P. perspectiva*, arranged according to the formula 12.8.1.8.12). Centrals having a long mesocone and small side cusps. Laterals having no entocone, the mesocone oblique, ectocone small. Marginals similar, but with short, broad basal plates (pl. 11, fig. 26, *P. perspectiva*).

In *P. balmei* the marginal teeth are like those of *Planogyra asteriscus*.

This section is distinguished from *Pyramidula s. str.* by its low spire, discoidal form, and the rib-striation, which is often obsolete below the periphery, but generally persists on the upper surface and within the umbilicus. The typical species of *Gonyodiscus* are carinated at the periphery, and those with rounded whorls have been separated under the name *Discus*, but such a separation does violence to the facts in the case, for *all intermediate stages of contour between the most acutely carinated and the rounded types occur*. As well might one separate *Papuina brumeriensis* from *diomedes* as a distinct section, or *Pyramidula (Patula) cumberlandiana* from *alternata*. Such classification may be left for those who point the small end of the telescope at nature.

Eurasian species.

- | | |
|---------------------------------------|------------------------------------|
| <i>P. abietana</i> Bgt. iii, 21. | <i>P. omalisma</i> Bgt. |
| <i>P. aperta</i> Mlldff. viii, 80. | <i>P. pallens</i> Gred. viii, 82. |
| <i>P. assarinensis</i> Calc. iii, 51. | <i>P. pauper</i> Gld. iii, 20. |
| <i>P. balmei</i> P. & M. iii, 30. | <i>P. putrescens</i> Lwe. iii, 31. |
| <i>flavescens</i> Parr. | <i>P. retexta</i> Sh. iii, 44. |
| <i>flavida</i> Zieg. | <i>P. rotundata</i> Müll. iii, 19. |
| <i>striolata</i> Ph. | <i>brocciana</i> Calc., Ben. |
| <i>P. bianconii</i> Dh. iii, 32' | <i>eupaniana</i> Calc., Ben. |
| <i>P. carpetana</i> Hid. | <i>radiata</i> DaC. |
| <i>P. concinna</i> Lwe. iii, 21. | v. <i>pyramidalis</i> Jeffr. |
| <i>P. costulata</i> Mlldff. iii, 266. | v. <i>globosa</i> Friedl. |
| <i>P. engonata</i> Shuttl. iii, 43. | v. <i>turtoni</i> Flem. iii, 19. |
| v. <i>pallidior</i> Mouss. | <i>P. ruderata</i> Stud. iii, 20. |
| <i>P. erdeli</i> Roth. iii, 30. | <i>umbilicus</i> Mark. |
| <i>P. flocculus</i> Mor. | <i>perspectiva</i> Fér. |
| <i>P. frivaldskyana</i> Rm. iii, 21. | v. <i>angulosa</i> Mouss. iii, 26. |
| <i>convexa</i> Fér. | v. <i>opulens</i> West. iii, 20. |
| <i>P. gortschana</i> Mouss. iii, 20. | <i>P. solaria</i> Mke. iii, 43. |
| <i>P. hauffeni</i> Schm. iii, 30. | <i>perspectiva</i> Mühl. |
| <i>P. luseana</i> Paiv. iii, 31. | <i>megerlei</i> Jan. |



P. sudensis Pfr. iii, 30.

P. zapateri Hid.

P. textilis Sh. iii 31.

American species.

P. perspectiva Say. iii, 20.

P. striatella Anth. iii, 20.

patula Dh.

v. *catskillensis* Pils.

P. bryanti Harp. iii, 43.

v. *cronkhitei* Newc. iii, 21.

P. horni Gabb. iii, 21.

Section *Lyrodiscus* Pilsbry, 1893.

Lyra MOUSSON, Rev. Faune Malac. Canar., p. 26. Not *Lyra* Cumberl., 1816.

Shell depressed, with large open umbilicus and low-convex spire, in form being like *Patula*; surface sculptured with slight growth-lines and numerous elevated cuticular spiral threads. Type *H. circumsessa* Shuttlew. Anatomy unknown. Distribution, Canary Islands.

P. circumsessa Sh.

P. torrefacta Lwe.

Subgenus *PATULA* Held, 1837.

Patula HELD, Isis, 1837, p. 918 (proposed for *alternata*, *rotundata*, *solaria*, *perspectiva*, *runderata*, *pygmæa*, *rupestris*).—*Euryomphala* BECK, Index Moll. p. 8 (proposed for *solitaria*, *alternata*, *perspectiva*, *runderata*, *solaria*, *rudis*, *rotundata*, *rupestris*, *pygmæa*, *pusilla*, *lineata* and some undescribed *Amphidoxa* or *Stephanoda* species).—*Euryomphala* HERM. et al.—*Anguispira* MORSE, Obs. Terr. Pulm. Maine, p. 11, type *H. alternata* Say.

Shell rather large and solid, with convex spire and open umbilicus; whorls rounded or carinated at the periphery. Surface striate, ribbed-striate or spirally ribbed, obliquely flamed, unicolored or spirally banded; lip thin, simple. Type *P. alternata* Say, pl. 14, figs. 34, 35, 36.

Animal having a large foot, its length greater than the diameter of the shell, the tail rounded; sole without any traces of longitudinal divisions; the foot-margins having a wide border above, bounded by a distinct groove, the grooves meeting over the tail (fig. 40). Eyepeduncles long and slender, tentacles minute. Mantle edge thick (pl. 14, figs. 40, 46, *P. alternata*).

Genital system simple, lacking accessory organs. Penis receiving the vas deferens and the retractor muscle at its summit. Spermatheca bulbous, its duct very long. Ovi-sperm duct very much convoluted, the ovo-testis consisting of small groups of large club-shaped follicles. Eye-peduncle retracted between the branches of the genitalia (pl. 11, fig. 20, *P. alternata* Say. Pl. 11, fig. 27, *P. strigosa* Gld.)

Jaw strong and opaque, arcuate, with a slight or obvious median projection; surface rather faintly subvertically striated (pl. 11, fig. 18, *P. alternata*. Pl. 11, fig. 17, *P. strigosa*).

Radula: Central teeth having the mesocone long, side cusps small. Laterals having a large mesocone and a well developed ectocone; no entocone. Marginals similar, but with the basal plate short, as usual (pl. 11, fig. 23, *P. alternata*). This type of dentition is common to *P. alternata*, *solitaria* and *idahoensis*. In *P. cumberlandiana* the side cusps are obsolete on central and inner lateral teeth.

In *P. strigosa* and *haydeni* the central and lateral teeth lack ectocones. The outer marginal teeth have an ectocone developed, and sometimes it is split into two minute cusps (pl. 11, fig. 28, *P. strigosa*).

The Patulas of eastern America are oviparous, the eggs small, round, not hard-shelled. *P. strigosa* and its allies are viviparous, four to six young occupying the uterus at the same time, the most mature having a shell of $2\frac{1}{2}$ whorls, 3 to 4 mill. diameter, the earlier 2 whorls with fine oblique and spiral striae, marked off by a distinct line from the latter third of a whorl, which is spirally lirate and more or less hirsute. The viviparous mode of reproduction has probably been assumed on account of the aridity of the Rocky Mountain region. The rains are in this area uncertain, and for snails mainly unseasonable; and probably insufficient to insure the development of eggs committed to the earth in the usual way.

Snails of this section are distributed over the whole of the United States except the Californian slope. Individuals of the species are numerous, *P. alternata* in the East and *strigosa* in the West being among the commonest of land snails. They live by preference in rocky places, the talus of a limestone cliff being a favorite station.

The species are polymorphic to a degree inconceivable to those who have not actually seen large series of the shells. *P. alternata fergusonii* and *P. cumberlandiana* seem to be the extremes of one series of forms, and *P. idahoensis* and *haydeni* of another.

The name *Patula*, as well as *Egyriomphala*, was intended to include all of the forms referred now to the genus *Pyramidula*; and most recent authors have adopted *Patula* as the generic name. Such a course is inadmissible on account of the earlier names *Pyramidula*, *Gonyodiscus* and *Discus* of Fitzinger; and there is, moreover, another difficulty, for *Patula*, *Delomphalus* and *Egyriomphala* were all proposed in the same year (1837), and it is now impossible to decide which should be given priority. In von Martens' edition of Albers, the type of *Patula* is said to be *H. rotundata*; but as that species was already the type of a prior group (*Discus*), we cannot accept such a selection. We are, therefore, obliged to consider Held's first species, *H. alternata*, the type.

Species.

- | | |
|--|---|
| P. <i>alternata</i> Say, iii, 57. | P. <i>strigosa</i> Gld. (Pl. 14, f. 37-39.) |
| <i>scabra</i> Lam. | <i>f. depressa</i> Ckll. |
| <i>strongylodes</i> Pfr. | <i>f. fragilis</i> Hemph. viii, 117. |
| <i>infecta</i> Parr. | <i>f. carnea</i> Hemph. viii, 117. |
| v. <i>fergusoni</i> Bld. iii, 57. | <i>f. rugosa</i> Hemph. viii, 117. |
| v. <i>mordax</i> Shutt. iii, 57. | <i>f. albida</i> Hemph. viii, 117. |
| P. <i>cumberlandiana</i> Lea, iii, 58. | <i>f. buttoni</i> Hemph. viii, 117. |
| P. <i>solitaria</i> Say, iii, 58. | <i>f. globulosa</i> Ckll. viii, 118. |
| <i>kochi</i> Pfr. | v. <i>jugalis</i> Hemph. viii, 117. |
| <i>subrudis</i> Pfr. | v. <i>subcarinata</i> Hemph. viii, 118. |
| P. <i>idahoensis</i> Newc. iii, 55. | <i>bicolor</i> Hemph. viii, 118. |
| v. <i>newcombi</i> Hemph. viii, 115. | <i>lactea</i> Hemph. viii, 118. |
| <i>f. wasatchensis</i> Hemph. viii, | <i>picta</i> Hemph. viii, 118. |
| [116. | v. <i>cooperi</i> W. G. B. viii, 118. |
| v. <i>binneyi</i> Hemph. viii, 116. | P. <i>haydeni</i> Gabb. iii, 57. |
| <i>f. multicosata</i> Hemph. viii, 116. | <i>f. hemphilli</i> Newc. viii, 119. |
| <i>f. castanea</i> Hemph. viii, 116. | <i>f. gabbiana</i> Hemph. viii, 119. |
| <i>f. albofasciata</i> Hemph. viii, 116. | <i>f. bruneri</i> Anc. viii, 119. |
| <i>f. gouldi</i> Hemph. viii, 116. | <i>oquirrhensis</i> Hemph. |
| P. <i>strigosa</i> Gld. viii, 117. | <i>hybrida</i> Hemph. |
| <i>parma</i> Hemph. | |

Subgenus ATLANTICA Aucey, 1887.

Atlantica ANC., Conch. Exch. i, p. 54, April, 1887, type *H. semiplicata* Pfr.

Shell small, discoidal, with wide shallow umbilicus and low-convex spire; whorls narrow, obliquely ribbed above, polished below, the

last obstructed far within by several *pairs of elevated lamellæ* upon the basal-outer wall (fig. 32). Lip thin, simple. Type *H. semiplicata* Pfr. pl. 14, fig. 32, 33.

Anatomy unknown. Distribution, Madeira. This group is probably a modification of *Goniodiscus*.

P. semiplicata Pfr. iii, 44.

P. calathoides Paiv. iii, 44.

gueriniana Lwe.

Subgenus *HELICODISCUS* Morse, 1864.

Helicodiscus MSE., Obs. Terrest. Pulm. Maine, p. 25, type *H. lineata* Say.

Shell small, disk or coin-shaped, with flat spire and broad, shallow umbilicus. Whorls numerous, convex and closely coiled, spirally striated or lirate, the last whorl having one or several pairs of tubercular teeth within, situated upon the basal-outer wall. Aperture lunate, lip thin, simple. Type *P. lineata* Say, pl. 14, figs. 29, 30, 31.

The shell lies perfectly flat upon the posterior end of the foot, the eye-peduncles standing nearly vertically; posterior end of the long and narrow foot conspicuously furrowed above, very short behind the mantle (pl. 14, figs. 47, 48, *P. lineata*).

Jaw arcuate, striate, the striae diverging somewhat from the median line; median projection inconspicuous (pl. 15, fig. 1, *P. lineata*).

Morse's figure represents the jaw as less arcuate and pointed at the ends. The jaw figured on my plate, however, seems to be perfect, although the ends are blunt.

Radula having about 77 rows of 12·1·12 or 13·1·13 teeth. The central tooth is decidedly narrower than the laterals, its mesocone very short, side cusps minute. Laterals with large square basal-plates, the mesocone as long as the basal-plate, entocone and ectocone equally developed, strong, with short cutting points. Marginals low, wide, the ectocone bifid or trifid (pl. 11, fig. 24, *P. lineata*).

These minute snails live upon decaying wood. The most conspicuous features of the dentition are the tricuspid lateral teeth, recalling those of *Stephanoda* or *Charopa*, and unlike the teeth of *Pyramidula* generally, in which the entocones are as a rule absent. The splitting of the ectocones of the marginal teeth is correlated with the small size of the creature, snails of many groups assuming the Pupa-like form of marginal teeth when the size of the animal becomes minute.

- P. lineata* Say, ii, 200. *P. fimbriatus* Weth. ii, 200.
 v. *salmonensis* Hemph.
 salmonaceus Hemph., W. G. B.
 v. *sonorensis* Coop.

Subgenus ? *PUPISOMA* Stoliczka, 1873.

Pupisoma STOL., Journ. Asiat. Soc. Beng. xlii, p. 32.—PFR.-CLESS, Nomencl. Hel. Viv., p. 352.—v. MOLLENDORFF, Bericht Senck. naturforsch. Ges., 1890, p. 223.

Shell minute, thin, brown, perforated; varying from Pupiform, almost cylindrical, to globose-conoidal; apex obtuse; whorls rounded, with delicate, irregular, cuticular riblets. Aperture oblique, truncate-oval or rounded, the lip thin, simple or a little expanded, broadly dilated at the columella, nearly closing the umbilical perforation; the columellar edge sometimes slightly projecting, but hardly dentate. Type *Pupa lignicola* Stol., pl. 14, figs. 41, 42. See also *P. philippinicum* Mlldff., pl. 14, figs. 43, 44.

Animal having very short eye peduncles and barely a trace of tentacles. (*Stol.*). Jaw, radula and genitalia unknown.

Distribution, India, Borneo, Philippines.

A group of uncertain position. Stoliczka referred it to *Pupidae*; v. Möllendorff to the *Fruticicola* series, near *Acanthinula* and *Zoogenites*. For the present I prefer to consider it a modification of *Pyramidula*, comparable to the American group *Ptychopatula*; but I am not sure that it is not a group of *Pupidae*.

- | | |
|---------------------------------|--------------------------------------|
| <i>P. lignicola</i> Stol. | <i>P. pulvisculum</i> Iss. iii, 191. |
| <i>P. orcella</i> Stol. | <i>P. philippinicum</i> Mlldff. |
| <i>P. orcula</i> Bens. ii, 177. | <i>P. miccylla</i> Bens. ii, 176. |

Genus *PARARHYTIDA* Ancey, 1882.

Pararhytida ANC., Le Naturaliste 1882, p. 85; Bull. Soc. Mal. Fr. v, p. 360.—*Platystoma* ANC., 1882, Not *Platystoma* of Klein or Hörnes, nor *Platystoma* Conr.—*Saissetia* (Bayle) ANC., Bull. Soc. Mal. Fr. v, p. 368, 1888.

Shell perforate or umbilicate, *solid and strong*, depressed, acutely keeled (but periphery rounded in section *Saissetia*). *Baso-columellar lip thickened by a callus within, and dilated at the insertion.* Type *H. dictyodes* Pfr.

Under this generic head may be comprised two groups, as follows:

Section *Pararhytida s. str.*

Shell thick lens-shaped, in form like *Trochomorpha*. Whorls about 6, *slowly increasing, acutely keeled*, basal lip somewhat sinuous. Type *H. dictyodes* Pfr., pl. 7, figs. 25, 26, 27.

External anatomy unknown. Jaw arcuate, quite strong, without median projection, and absolutely smooth (pl. 9, fig. 35, *P. dictyodes*).

Radula composed of 22-14-1-14-22 teeth in nearly horizontal series. Central tooth tricuspid, the mesocone attaining the anterior border of the basal-plate, side cusps small. Lateral teeth tricuspid, slightly asymmetrical. Marginal teeth also tricuspid, the entocone and mesocone united at their bases (pl. 9, fig. 36, *P. dictyodes*).

Genitalia: Penis stout, extending into a long flagellum (?), the vas deferens inserted high upon it; the stout lower portion bearing a globose appendix, at the base of which the retractor is inserted. Vagina is short, muscular and swollen. Spermatheca very large and long, its duct short; (in the figure is shown a spermatophore within it). Albumen gland small; hermaphrodite duct long, not convoluted (pl. 9, fig. 37, *P. dictyodes*).

The notable generic features of the anatomy are that *all of the teeth are tricuspid* (as in many *Endodonta*s); *the jaw is smooth*, not vertically striated; the penis bears a flagellum and apparently an appendix. The most important shell characters are the solidity, and the callous thickening of the baso-columellar lip.

I have considered *Pararhytida* a genus separate from *Endodonta* mainly on account of the smooth jaw. In *Endodonta*, *Pyramidula*, etc., the jaw is always laminate or striate. In *Pararhytida* its component laminae seem to be completely fused. The characters of the foot must be examined before we can intelligently discuss the systematic position of *Pararhytida*. Our knowledge of its anatomy is due to Fischer (Journ. de Conchyl., 1875).

P. dictyodes Pfr. iii, 95.

P. mouensis Cr. iii, 95.

v. dictyonina Euth. viii, 134.

Section *Saissetia* (Bayle) Anc., 1889.

Shell solid, depressed-globose or subdiscoidal, the spire slightly convex; umbilicus rather narrow. *Whorls rapidly increasing, the*

last one wide, rounded at the periphery. Lip generally somewhat retracted at the upper insertion, thickened on the baso-columellar margins, dilated at the basal insertion. Surface smooth or rib-striate above. Type *H. saisseti* Montr., pl. 7, figs. 22, 23, 24.

The soft anatomy is unknown. Binney has figured the jaw and teeth of *P. astur*. The jaw is low, wide, slightly arcuate, ends hardly attenuated, blunt; anterior surface without ribs; having a wide, blunt median projection; a line of reinforcement runs parallel to the cutting edge; upper margin with a strong muscular attachment (pl. 8, fig. 7). The radula has 21-9-1-9-21 teeth. Centrals tricuspid; laterals lacking the entocone, at least on the inner teeth; marginals tricuspid, the entocone and mesocone united.

It will be seen that this differs from typical *Pararhytida* in the median projection of the jaw and the loss of entocones on the lateral teeth (pl. 8, fig. 8).

As no type was designated by Ancey, I have considered *H. saisseti* Montr. as such, for I suppose this was Bayle's intention.

Species.

- | | |
|------------------------------------|-----------------------------------|
| <i>P. baladensis</i> Souv. i, 116. | <i>P. occlusa</i> Gass. i, 122. |
| <i>P. oriunda</i> Gass. i, 121. | <i>P. astur</i> Souv. i, 117. |
| <i>P. bruniana</i> Gass. i, 119. | <i>P. saisseti</i> Montr. i, 117. |
| <i>P. perroquiniana</i> Cr. | <i>P. goulardiana</i> Cr. i, 122. |
| <i>P. turneri</i> Pfr. i, 119. | |

Genus THYSANOPHORA Strebel & Pfeffer, 1880.

Thysanophora S. & P., Beitr. Mex. Land- und Süßwasser-Conchylien, iv, p. 30 (proposed for *impura*, *paleosa*, *conspurecatella*).—PILSBRY, Proc. Acad. Nat. Sci. Phila. 1889, p. 192.

Microphysa MARTENS in Albers, Die Hel., p. 82; type *Helix boothiana* Pfr. Not *Microphysa* Westw., 1834 (Hemiptera), nor of Guen. 1841 (Lepidoptera).

Acanthinula STREBEL & PFEFFER, l. c., p. 31, and of v. MARTENS, Biol. Centr. Amer., p. 130. Not *Acanthinula* Beck.—*Ptychopatula* PILSBRY, Proc. Acad. Nat. Sci. Phila. Sept. 17, 1889, p. 191; *Nautilus* iii, p. 62 (proposed for *cacca*, *dioscoricola*, *punctum*, *plagioptycha*, etc.).

Euclasta v. MARTENS, Jahrb. D. M. Ges. 1877, p. 347 (for *H. musicola* Sh.).—CROSSE, Journ. de Conchyl. 1892, p. 14. Not

Eucusta Lederer, Verh. Zool.-bot. Vereins in Wein, v, p. 252, 1855, and Weiner Entom. Monatschr. vii, p. 423, 1863 (Microlepidoptera).

Shell varying from flat and discoidal to depressed-globose and to conical or pyramidal; *thin*; pale brown, yellow or corneous, *somewhat translucent or at least not opaque*; narrowly umbilicated; surface rather dull, smooth or with slender riblets (generally cuticular), or densely, minutely bristly. Embryonic whorl not distinctly demarked from the after-growth, smooth or granular. Whorls 4-6½, convex, *separated by deep sutures*, the last whorl rounded or carinated. Aperture lunate or oblong; lip thin, simple or a trifle expanded, the columellar margin more or less dilated. Type *T. conspurcatella* Morel., pl. 16, fig. 3. (See also pl. 16, fig. 4, *T. ceca*. Pl. 16, figs. 5, 6, 7, *T. hypolepta*. Pl. 16, figs. 8, 9, 10, *T. stigmatica*. Pl. 16, figs. 1, 2, *T. turbiniformis*).

Foot (of *T. peraffinis*) narrow, the sole not tripartite; upper surface granulated, the tail having a median sulcus above (pl. 15, fig. 8), sides granulated, with oblique grooves but no distinctly differentiated foot-margin (fig. 9). Tail without mucus pore.

Genital system unknown, but oviduct (of *T. peraffinis*) containing several hard and brittle-shelled white eggs. *T. vortex* has been observed by Morse to be viviparous. In this genus, therefore, as in *Sagda*, both viviparous and oviparous species occur.

Jaw *thin and delicate, flexible*, strongly arcuate, *composed of many flat, narrow lamellæ, the free edges of which appear as vertical striæ*; lower margin of jaw denticulated by the lamellæ (pl. 15, fig. 7, *T. peraffinis*. Pl. 15, fig. 6, *T. turbiniformis*).

Dentition: Rhachidian tooth with square basal-plate and three stout cusps, the mesocone projecting beyond the basal-plate. Lateral teeth bicuspid, the entocone completely absent. Marginal teeth various in form; having either (1) a long oblique mesocone, and a small simple or bifid ectocone (*T. peraffinis* pl. 15, fig. 10, and also *T. incrustata*, *T. ingersolli*); or (2) the mesocone is bifid by union with the entocone (*T. turbiniformis* pl. 15, fig. 5, and also *T. granum*, *T. vortex*, *T. pubescens*). In *T. granum*, *incrustata* and *vortex* the ectocone is trifid; in the others it is either simple or bifid.

The jaws and teeth of *turbiniformis* and *pubescens*, and the teeth of *T. ceca* have been figured by W. G. Binney, Ann. N. Y. Acad. Sci. iii, pp. 105, 106, 113; those of *T. incrustata*, *T. ingersolli* and *T.*

vortex in Terr. Moll. v, p. 170-173, and Man. Amer. L. Sh., p. 356. The jaws and teeth of *T. perdepressa* and *T. peraffinis* have been examined by myself. All of these species have essentially the same type of jaw. The teeth vary only in the denticulation of the marginals, as noted above. The jaw is distinctly stegognathous in type, being more like that of *Flammulina* than that of *Pyramidula*.

The absence of a parapodial groove widely sunders this genus from *Pyramidula*, *Charopa*, *Phasis* and *Amphidoxa*. The first of these groups differs also in the structure of the jaw. *Thysanophora* agrees with *Hyalosagda* in characters of the jaw, dentition, foot and the calcareous-shelled eggs.

The shell of *Thysanophora* somewhat resembles that of *Pyramidula*; but it is less opaque, never flame-painted nor strongly ribstriate. The columella moreover is generally dilated as in *Trachycystis*.

The species inhabit the Greater Antilles, with a few in Bermuda, Florida and the Gulf States, and extending to the Middle American mainland from Vera Cruz and Yucatan south to Trinidad. The forms from the periphery of this area are small or minute, but in the large West Indian islands species of considerable size occur. These snails live upon the ground, under leaves or stones.

More than any other group of Antillean Helices, the *Sagda-Thysanophora-Zaphysema* group impresses us as being an original West Indian element. The other main genera of the Antilles, *Pleurodonte* and *Hemitrochus*, with the allies of each, show far-reaching affinities with Old world Helices; and *Polygyra* has been derived from the North American fauna; but not only is the *Sagda-Thysanophora-Zaphysema* group characteristic of the Antillean region now, but no Helices known to approach them in morphology of genitalia and shell have been found in any other part of the world. Thus, as far as present knowledge enables us to judge, of the three main stocks into which the West Indian Helix fauna is sharply divided, the *Thysanophora*, etc., phylum is that which has longest occupied the region, and probably developed its peculiar features therein, arising from some very early, undifferentiated Helix stock of the Polyplacognathous type. The other two great groups are much later (although still ancient) elements, which reached the Antillean tract after their essential anatomical features had become well established.

The forms of this genus are so little known anatomically that any attempt at sectional division would now be premature. By purely conchological standards, three sections are indicated: (a) *Thysanophora* restricted, including small forms having cuticular riblets more oblique than, and crossing, the growth-lines. This may include *Ptychopatula* (type *cæca*, pl. 16, fig. 4) which differs in being globosely elevated with only a minute umbilicus. *Acanthinula* of Strebel and v. Martens (in Biol. Centr. Amer.) is a synonym. (2) forms of the type of *vortex*, with smoother surface, the spire varying from flat to pyramidal; mostly Antillean. *T. ptychodes*, *T. turbiniformis* (pl. 16, figs. 1, 2), etc., belong here also. (3) Larger forms, with the spire mostly depressed, sometimes concave, the surface minutely roughened or bristly, such as *T. stigmatica* (pl. 16, figs. 8, 9, 10), *T. suavis*, *T. relutina*, etc., from the Greater Antilles, and *T. sigmoides* from Guatemala.

Species of the mainland, Trinidad to Texas and Florida, etc.

- | | |
|---|---|
| <i>T. conspurcatella</i> Morel. iii, 50. | <i>T. venezuelensis</i> Jouss. viii, 112. |
| <i>T. impura</i> Pfr. iii, 50. | <i>T. rojasi</i> Jouss. viii, 112. |
| <i>T. incrustata</i> Poey. ii, 204. | <i>T. vortex</i> Pfr. iii, 93. |
| <i>T. ingersolli</i> Bld. iii, 101. | <i>T. turbinella</i> Morel. iii, 51. |
| <i>T. paleosa</i> Streb. iii, 50. | <i>T. cæcoides</i> Guppy. iii, 55. |
| <i>T. granum</i> Streb. iii, 55. | <i>T. guatemalensis</i> C. & F. ii, 174. |
| <i>T. ierensis</i> Guppy. iii, 55. | <i>T. coloba</i> Pils. |
| <i>T. plagiptycha</i> Sh. ii, 174. | <i>T. punctum</i> Morel. iii, 53. |
| <i>T. dioscoricola</i> C. B. Ad. ii, 174. | <i>T. intonsa</i> Pils. viii, 111. |
| <i>T. cæca</i> Guppy. iii, 55. | <i>T. sigmoides</i> Morel. iii, 101. |
| <i>T. bactricola</i> Guppy. iii, 55. | <i>vitrinoides</i> Tristr. |
| <i>T. hornii</i> Gabb. iii, 21. | |

[Of the above species, *T. granum* and *ierensis* are probably mere varieties of *plagiptycha*, and *T. cæca* and *punctum* varieties of *dioscoricola*. Specimens of all the above, except *turbinella*, *guatemalensis*, *venezuelensis*, *rojasi* and *punctum* are in the collection of the Academy.]

Species of the West Indies and Bermuda.

- | | |
|---|---|
| <i>T. alveus</i> C. B. Ad. iii, 98. | <i>T. musicola</i> Shutt. iii, 97. |
| <i>T. angustispira</i> C. B. Ad. iii, 97. | <i>v. major</i> Crosse. |
| <i>T. anthonia</i> C. B. Ad. iii, 96. | <i>T. peraffinis</i> C. B. Ad. iii, 98. |

- T. arecibensis* Pfr. iii, 58.
T. boothiana Pfr. iii, 97.
 v. *vitrina* C. B. Ad. iii, 97.
T. brevior C. B. Ad. iii, 99.
 depressa Ad.
T. cyclostomoides Pfr. iii, 100.
T. debilis Pfr. iii, 101.
 fragilis Pfr.
T. desiderata Pfr. iii, 96.
T. diminuta C. B. Ad. iii, 99.
T. dioscoricola C. B. Ad. ii, 174.
T. elatior Weinl. & Mts. iii, 97.
T. euclasta Shutt. iii, 97.
 swifti Pfr.
T. fuscula C. B. Ad. iii, 98.
T. gracilis Poey.
T. hilum Weinl. & Mts.
T. hypolepta Shutt. viii, 111.
T. immunda C. B. Ad. iii, 99.
T. inaguensis Weinl. iii, 41.
T. inconspicua C. B. Ad. iii, 99.
T. incrustedata Poey, ii, 201.
 incrassata Rve.
 saxicola Gld.
T. jeannereti Pfr. iii, 53.
T. krugiana Mart.
T. leucoraphe Pfr. iv, 77.
T. montetaurica Pfr. iii, 97.
T. perdepressa C. B. Ad. iii, 100.
T. plagiptycha Shutt. ii, 174.
T. portoricensis Pfr. iii, 96.
T. prominula Pfr.
T. pruinosa Pfr. iii, 186.
T. ptychodes Pfr. iii, 100.
T. pubescens Pfr. iii, 184.
T. raripila Morel. iii, 101.
T. rufula Pfr. iii, 99.
T. sincera C. B. Ad. iii, 99.
T. sprete C. B. Ad. iii, 98.
 v. *errans* Ad. iii, 98.
T. stigmatica Pfr. iii, 100.
T. suavis Gundl. iii, 100.
T. subaquila Shutt. iii, 98.
T. tichostoma Pfr. iii, 100.
 lamellina Newc.
T. translucens Gundl. iii, 96.
T. turbiniformis Pfr. iii, 96.
 subpyramidalis C. B. Ad.
 macnabiana Chitty.
 pyramidatoides d'Orb.
T. velutina Lam. iii, 100.
T. virescens Pfr. iii, 96.
T. vortex Pfr. iii, 98.
 selenina Gld.
 otellina Röse.
 v. *bracteola* Fér.

Genus SAGDA Beck, 1837.

Sagda BECK, Index Molluscorum p. 9 (for *alveolata* B. and *australis* Ch. B.).—ALBERS—MARTENS, Die Hel. p. 76.—SHUTTLEWORTH, Bern. Mittheil. 1853, p. 85.—See also BINNEY, Ann. N. Y. Acad. Sci. iii, p. 88.—SEMPER, Reisen im Archip. Phil., Landmoll., p. 128, and PILSBRY, Proc. Acad. Nat. Sci. Phila. 1892, p. 213.—*Epistilia* SWAINS. Malacol., p. 165, type *E. conica* Swains., l. c., f. 18a [= *S. jayana*?].—*Epistyla* SWAINS., l. c., p. 331, type *E. conica* Sw. [= *S. cookiana*?].

+ *Hyalosagda* ALB. and *Odontosagda* MARTENS, Die Hel., p. 77, 78.

Shell having the texture of *Zonites* or *Hyalinia*, imperforate or umbilicate, varying in form from depressed and subdiscoidal to globose-conic or trochoidal; whorls 6-9, narrow and slowly increasing, the last not deflexed in front. Aperture nearly vertical, lunate, either with or without internal laminae; lip thin, sharp and simple, slightly dilated or reflexed at the axis; columella short, having a callous fold, or thin and simple. Type *S. cookiana* Gmel., pl. 16, figs. 11, 12, 13. (See also pl. 16, figs. 14-20).

Animal viviparous, or oviparous with hard-shelled eggs.

Foot extremely long and narrow (the sole in *S. similis* measuring length 20, width 3 mill.), strongly granulated above, the tail having an impressed median longitudinal line or groove, acute behind; sides of foot without longitudinal grooves, but marked by a zigzag line (pl. 35, fig. 7); sole not divided longitudinally (pl. 35, fig. 8, *S. similis*).

Genital system much elongated, the vestibule short. Penis long, the vas deferens and a flagellum inserted at its apex (pl. 35, fig. 2), and an elongated appendix inserted at the lower third (appendix of *S. similis* seen convoluted in the normal manner in pl. 35, fig. 2, partially straightened out in pl. 35, fig. 3). Vagina long and narrow; uterus larger, containing eggs or young shells; duct of spermatheca very long, expanded near the base (pl. 35, fig. 4, *S. similis*). See also pl. 21, fig. 9, penis of *S. cookiana*, p. penis, a. appendix, r. p. retractor muscle, fl. flagellum. Fig. 10 shows the appendix partially uncoiled.

Jaw thin, arcuate, smooth, with a slight median projection or none in *S. foremaniana*, *haldemania*, *jayana* and *cookiana* (pl. 21, fig. 8). In *S. similis* (pl. 35, fig. 6) it is thin, arched, and of the stegognathous type, being composed of 27 narrow flat vertical plates, soldered together, the outer imbricating edges of which are distinctly visible.

Radula having the transverse rows of teeth nearly straight. Central teeth having a square basal-plate and three cusps, the mesocone longer than the basal-plate. Lateral teeth bicuspid, the mesocone long. Marginal teeth also bicuspid. (Pl. 21, fig. 7, *S. cookiana*; pl. 35, fig. 5, *S. similis*; pl. 35, fig. 1, *S. haldemania*).

The jaw of *foremaniana* has been described by Semper, that of *haldemania* and *jayana* by Binney, that of *cookiana* by myself; all agree in being smooth (oxygnathous) as described above. The jaw of *S. similis*, examined by the writer, is of the plaited type. The teeth of *foremaniana* are described by Semper, those of *connectens*,

haldemaniana and *jayana* by Binney. All agree with the description given above, and with those of *S. similis* and *S. cookiana* examined by the writer.

The prominent features of the shell in this genus, are its *Zonites*-like texture, the subvertical aperture, and sharp simple lip. The genital system is peculiar for its appendix and flagellum on the penis, and the long spermatheca duet. The teeth of the species investigated agree in the long mesocones, constantly present ectocones, and bicuspid marginals. The jaw in the typical forms is smooth, by the complete union of its component laminae; in the section *Hyalosagda*, which is nearer the ancestral stock, the jaw shows vertical imbricating plates, as in *Thysanophora*, *Flammulina*, etc.

The genus *Sagda* is by no means so isolated in the family of Helices as has been supposed. Its relationship with *Thysanophora* and especially with *Zaphysema*, is moderately intimate.

The analogy of the shell of *Sagda* with that of the Zonitid genus *Gastrodonta* is remarkable. Both contain forms with spiral internal laminae, and depressed forms without laminae; the section *Hyalosagda* being quite comparable to the section *Zonitoides*. *Gastrodonta* too, has elevated forms (*G. ligera*, etc.) recalling *Sagda* in contour.

Sagda is confined to the island of Jamaica, with the exception of the subgenus *Odontosagda* inhabiting Haiti and Cuba. The species and forms are numerous, extremely variable, and correspondingly difficult to determine. This difficulty is enhanced by the fact that some of the best specific characters can be seen only by breaking an opening in the last whorl a half revolution behind the aperture; the vicinity of the suture being the best place for the incision. By this means only may the form and length of the lamellae be observed, as is the case with *Plectopylis* and some other groups. The lamellae are present in young specimens, but are progressively absorbed as the animal grows, so that in adults they do not extend inward much beyond the last whorl. The basal lamina is sometimes totally absent in species normally possessing it, just as in *Gastrodonta*; but as in that genus, it is a comparatively rare condition in most species.

Subdivisions.

Section *Sagda* (restricted). Shell *imperfurate*, the axis solid; aperture having a spiral lamina within the last whorl and generally a fold on the columella. Type *S. cookiana*, pl. 16, figs. 11-13. (See also pl. 16, figs. 16, 17, *S. connectens*, and pl. 16, figs. 14, 15, *S. alligans*.)

Animal *viviparous*, the young at birth being depressed-globose, flattened above, thin, translucent, perforated; composed of $2\frac{1}{2}$ whorls; measuring nearly one-fifth the diameter of the adult. We have observed young shells in specimens of *cookiana*, *foremaniana* and *ambigua*.

Section *Hyalosagda* Martens. Shell perforate or umbilicate, glassy, thin and depressed. Aperture with no internal lamellæ or teeth. Type *S. similis*, pl. 16, figs. 18, 19, 20.

Animal *oviparous*, the eggs short-oval, with a hard, white, smooth calcareous shell; the length of its longest axis contained 5 to 6 times in the diameter of the shell. We have found eggs in *S. haldemania* and *S. similis*.

Subgenus ODONTOSAGDA Martens. Small, thin and *umbilicated*; internal laminæ interrupted; columella thin.

The extreme difficulty of the genus, and the inadequacy of the accounts of it in the works of Pfeiffer, Reeve and Tryon, induce me to offer the following key to the species. Shuttleworth has published an excellent revision of the group. All known Jamaica species are represented in the collection of the Academy.

Key to the species of Sagda.

I. Aperture provided with internal teeth or laminæ.

a. Basal lamina either interrupted, or less than $\frac{1}{2}$ whorl in length; base *very* convex; form subglobose or globose-conic.

b. Base deeply impressed at columella; basal lamina interrupted.

c. Globose-conic; solid, strong, yellow; columellar fold weak or *obsolete*; basal lamina interrupted forming several teeth; whorls 9; alt. 21, diam. 22 mill. *cookiana*.

bb. Base not deeply impressed; basal lamina continuous; columella with a nodule-like fold.

c. Globose-pyramidal; base *globosely* convex, not impressed at columella; solid, strong, yellow; columellar fold a strong nodule, not entering; basal lamina very strong, $\frac{1}{2}$

- whorl long*; whorls 7; alt. 16-18, diam. 17 mill. *forenmaniana*.
- cc. Globose; thin, subtranslucent, corneous; base globosely convex, hardly impressed; columellar fold strong and heavy, *spirally entering*; basal lamina strong, *short*, one-fourth whorl long; whorls 6; alt. 12, diam. 12-13 mill. *pila*.
- ccc. Globose-subconic; thin but rather solid. translucent; base very convex, only slightly impressed; columellar fold a stout nodular callus, somewhat entering; basal lamina strong, about $\frac{1}{3}$ whorl long; *an additional small fold developed between basal and columella folds*; whorls 6-7; alt. 16, diam. 16 mill.; alt. 11, diam. 13 mill. *triptycha*.
- aa. Basal lamina $\frac{1}{3}$ to $\frac{1}{2}$ whorl long, continuous; base not notably convex.
- b. Large, solid and elevated.
- c. Trochoidal; *base not excavated in the middle*; no columellar fold; basal lamina deep-seated, about $\frac{1}{3}$ whorl long; whorls 8; alt. 24-26, diam. 27-30 mill. *alligans*.
- cc. Elevated trochoidal; *base deeply excavated in the middle*; columellar fold and basal lamina strong within, spirally entering, but sometimes neither is visible from the aperture; whorls 9; alt. 25, diam. 27-28 mill.; alt. 18, diam. 24 mill. *jayana*.
- bb. Small, thin, depressed.
- c. Depressed-subglobose, thin, subtranslucent greenish-yellow, *the surface minutely spiculose*; base slightly excavated; columella calloused; *lamina peripheral in position, extending nearly to lip-edge*; whorls 6; alt. 9, diam. 13 mill. *lamellifera*.
- cc. Subdiscoidal, thin, translucent, polished; base excavated; columella calloused; *basal lamina not deep-seated, $\frac{1}{3}$ - $\frac{1}{2}$ whorl long*; whorls $6\frac{1}{2}$; alt. $6\frac{1}{2}$, diam. 11 mill. *osculans*.

aaa. Basal lamina one whorl long or more.

b. Lamina peripheral in position, *lamellifera*.

bb. Lamina basal in position.

c. *Much depressed-trochoidal*, solid, somewhat translucent, smooth; *base but little excavated*; columellar fold small or obsolete; basal lamina more than a whorl long; whorls $7\frac{1}{2}$ –9; alt. 16, diam. 23–25 mill.

connectens.

cc. Trochoidal, solid, strong, *costulate-striate above the periphery*; no columellar fold; basal lamina a full whorl long; whorls 7; alt. 17, diam. 20 mill.; alt. 13, diam. 16 mill.

epistylroides.

ccc. Globose-trochoidal, solid, strong; *base somewhat excavated*; columellar fold *strong and lamellar within*; basal lamina strong, about one whorl long; whorls 8; alt. 18, diam. 19 mill. Smaller and paler than *jayana*, with less excavated base, but probably a variety of *jayana*.

alveare.

cccc. Elevated trochoidal, solid, strong and opaque; *base deeply excavated*; columellar fold and basal lamina strong within, but often not visible from the aperture; whorls 9; alt. 25, diam. 27–28 mill.; alt. 18, diam. 24 mill.

jayana.

ccccc. Globose-trochoidal, solid but thin, *covered with a yellow cuticle bearing minute spicules or pitted*; base depressed, excavated; columella with a strong lamellar fold; basal lamina long; whorls 8; alt. 12, diam. $14\frac{1}{2}$ mill.

spiculosa.

cccccc. Elevated, *pyramidal*, solid, subtranslucent; upper whorls finely costulate-striate; base narrowly and *but little excavated*; columella having a *blunt callous fold, spirally entering*; basal lamina strong, about one whorl long; whorls 8–9; alt. 17, diam. 16 mill.,

torrefacta.

II. Aperture lacking internal teeth or laminæ.

- a.* Umbilicus moderate, its breadth contained 9-15 times in diameter of shell.
- b.* Diam. 13-16, alt. 7-9 mill. *similis.*
- bb.* Diam. 9-10, alt. 5-5½ mill. *hollandi.*
- bbb.* Diam. 3-4, alt. 1½-1½ mill. *brevis.*
- aa.* Umbilicus reduced to a perforation partly closed by the reflexed columella, or wholly closed and imperforate.
- b.* Imperforate; base depressed; alt. 11½-12, diam. 5½-7 mill. *osculans v. delaminata.*
- bb.* Perforated; base convex, well impressed in the middle.
- c.* Diam. 11-12 mill. *haldemaniana.*
- cc.* Diam. 9-10 mill. *ambigua.*

Species of Sagda.

[See pl. 16, figs. 11-13, *S. cookiana*; pl. 16, figs. 14, 15, *S. alligans*; pl. 16, figs. 16, 17, *S. connectens*; pl. 16, figs. 18-20, *S. similis*.]

- | | |
|--|--|
| <i>S. cookiana</i> Gmel., iii, 6. | <i>v. delaminata</i> Ad. |
| <i>australis</i> Chem., auct. | <i>S. ambigua</i> C. B. Ad., iii, 9. |
| <i>conica</i> Swains. | <i>S. lamellifera</i> C. B. Ad., iii, 8. |
| <i>epistylum</i> Dillw., Sowb. | <i>S. epistylioides</i> Fér., iii, 6. |
| <i>foremaniana</i> Rve. | <i>S. jayana</i> C. B. Ad., iii, 6. |
| <i>S. foremaniana</i> C. B. Ad., iii, 7. | <i>? alveolata</i> Beck (undesc.). |
| <i>S. pila</i> C. B. Ad., iii, 8. | <i>cookiana</i> Pfr. |
| <i>S. triptycha</i> Shuttl., iii, 7. | <i>alligans</i> Rve. |
| <i>S. alligans</i> C. B. Ad., iii, 6. | <i>sayana</i> Alb.-Martens. |
| <i>epistylum</i> Pfr. & Rve., not | <i>? conica</i> Swains. |
| <i>? alveolata</i> Beck. [Müll. | <i>S. alveare</i> Pfr., iii, 7. |
| <i>S. connectens</i> C. B. Ad., iii, 6. | <i>S. spiculosa</i> Shuttl., iii, 7. |
| <i>S. osculans</i> C. B. Ad., iii, 8. | <i>S. torrefacta</i> C. B. Ad., iii, 7. |

(Section *Hyalosagda*).

- | | |
|--------------------------------------|---------------------------------------|
| <i>S. similis</i> C. B. Ad., iii, 9. | <i>S. hollandi</i> C. B. Ad., iii, 9. |
| <i>S. haldemaniana</i> Ad., iii, 8. | <i>S. ? brevis</i> C. B. Ad., iii, 9. |
| <i>arboreoides</i> Ad. | |

Subgenus ODONTOSAGDA Martens, 1860.

Odontosagda MARTENS, in Albers, Die Hel., p. 78.

Shell small, depressed, thin, whitish, smooth, *umbilicated*, with 5-6 convex narrow whorls; base convex. Aperture subvertical, lunate, the lip thin and simple; *interior having upon the basal wall several spiral laminae interrupted into teeth*, or with such a spiral lamina and a series of transverse blades; *columella thin, not calloused nor toothed*. Type *S. polyodon* (see pl. 20, figs. 35, 36, *S. hillei* Gundl.).

Anatomy unknown. Distribution, Haiti and eastern Cuba. This group differs from the toothed *Sagdas* of Jamaica in the perforated or umbilicate shell and the interrupted laminae.

S. polyodon Weinl. & Mart. ii, *S. blandi* Weinl. iii, 8.

[201. *S. hillei* Gundl. ii, 199.

Species erroneously referred by authors to Sagda: H. epistyliulium C. B. Ad. is a *Guppya*. *H. circumfirmata* and *discrepans* belong to the *Zonitidae*, genus *Pacilozonites*.

Genus ZAPHYSEMA Pilsbry, 1894.

Cysticopsis, in part, of authors.

Shell globose, thin, unicolored brownish, smooth except for slight growth-wrinkles; imperforate, the axis solid; composed of 5 to 6 convex whorls the embryonic shell consisting of two whorls, its junction with the after-growth marked by an indistinct oblique line; *the last whorl much wider, large and inflated*, hardly deflexed in front. Aperture large, round-lunate, moderately oblique, and toothless; *the lip thin, sharp and simple*, dilated and closely appressed at the white-calloused columella. Type *Helix tenerrima* C. B. Ad., pl. 16, fig. 21.

Foot black, rather short, granulated and obliquely grooved above, as in *Thysanophora* and *Sagda*, the tail obtuse, having a median longitudinal groove above; anterior half of the foot traversed on each side by an obliquely descending groove arising about the middle of the mantle insertion. Sole indistinctly tripartite.

The figures of the foot of *Thysanophora peraffinis* (pl. 15, figs. 8, 9, upper and lateral views) well represent that of *Z. tenerrima* also.

Genital system having a short vertibule. Penis long, the vas deferens inserted near the apex, where *a long flagellum* and a curved appendage are inserted; at the lower third of the penis arises an

appendix, which seems to be glandular, and terminates in two long flagellum-like organs; the retractor-muscle arises from a median dilation of the penis. Vagina short, narrow; uterus enormously distended with young shells. Spermatheca globular, situated on a *very long duct*, which is apparently branched (pl. 35, fig. 12, *Z. tenerima*).

Jaw wide, arcuate, with a slight median projection; composed of narrow vertical flat plates soldered together, their outer imbricating edges appearing as delicate spaced vertical striæ; above projects a narrow conical process, springing from the middle of its surface (pl. 35, fig. 10, *Z. tumida*).

Radula composed of short teeth with square basal-plates. Centrals having the mesocone about as long as the basal-plate, and very broad, side cusps small but well developed. Lateral teeth similar, but lacking entocones. Marginal teeth low and wide, the mesocone large, sometimes bifid at the apex; ectocone simple or bifid (pl. 35, fig. 11, *Z. tenerrima*; pl. 35, fig. 9, *Z. tumida*).

Distribution, Jamaica.

The shell in this genus is globose, with large body-whorl, spire convex or low-conoidal, lip sharp and thin. The jaw is like that of *Thysanophora* and *Sagda* in structure, being of the stegognathous type. The dentition closely resembles that of the two genera named, but in *Sagda* the mesocones are longer. The foot in the three genera *Thysanophora*, *Sagda* and *Zaphysema* is practically the same in structure. The genital system is similar in general features to that of *Sagda*. The modes of reproduction are identical in the three groups.

Binney has examined the jaw and teeth of *Z. tumida*; the writer has figured the teeth and genitalia of *Z. tenerrima*. The other species are still unknown anatomically.

The group *Cysticopsis*, in which these forms have hitherto been placed, differs widely from them in anatomical features. It must be included in the genus *Hemitrochus* as a sectional division.

In the single individual of *Z. tenerrima* examined, the thin-walled uterus contained 27 young shells, and an egg, which was globular, with thin brittle white shell. The young shells are depressed-globular, translucent, often iridescent, and measure alt. 1.5, diam. 2 mill.; whorls two. It would seem that in *Thysanophora*, *Sagda* and *Zaphysema* eggs are normally formed, having the shell hard and calcareous. In some species of each group the eggs

develop and hatch within the uterus, the young snails consume their egg-shells, using the lime for shell-building; they attain a growth of about two whorls or more before birth. In other species this prolongation of the antenatal period has not been established, and hard-shelled eggs are brought forth.

Species of Zaphysema.

- | | |
|--------------------------------|--------------------------------|
| Z. macmurrayi C. B. Ad., v, 7. | Z. tumida Pfr., v, 8. |
| Z. buddiana C. B. Ad., v, 7. | tunicata C. B. Ad. |
| Z. munda C. B. Ad., v, 9. | Z. tenerrima C. B. Ad., v, 8. |
| | Z. columellata C. B. Ad. v, 9. |

* * *

Genus PRATICOLELLA v. Martens, 1892.

Praticola STREBEL & Pfeffer, Beitr. Mex. Land- und Süßw. Conch. iv, p. 38, 1880, type *P. ocampi*. Not *Praticola* Swains., 1837.—*Praticolella* v. MART., Biol. Centr. Amer., Moll., p. 138.—*Dorcasia* BINNEY, Terr. Moll. v, p. 346, not of Gray.—See for anatomy, W. G. BINNEY, l. c.; SEMPER, Phil. Archip. p. 246; STREBEL & PFEFFER, l. c.

Shell of the ordinary *Helix* shape; narrowly umbilicated, globose, shining, opaque white or yellowish with translucent corneous and brownish spiral bands, the most constant band supraperipheral in position. Aperture lunate-rounded, slightly oblique, lip narrowly reflexed, dilated at the columellar insertion, sometimes thickened within. Type *P. ampla* Pfr. (see pl. 20, figs. 26, 27, *P. griseola*; pl. 20, fig. 28, *P. berlandieriana*; pl. 20, figs. 29, 30, 31, *P. flavescens*).

Mantle having both right and left body-lappets; sole indistinctly tripartite, the central area not sharply separated from the sides, but darker colored (in spirit).

Genitalia (pl. 21, figs. 1-4, *P. ocampi*=*ampla*) Female organs as in *Polygyra*, without dart sack, mucus glands or other accessory organs; spermatheca oval, its duct simple and very short. Penis large, the vas deferens inserted at its apex; retractor trifid, one branch inserted at apex and one at middle of penis, with a small branch to vas deferens (fig. 2). Cavity of penis containing a tongue shaped papilla (pl. 21, fig. 3), inserted near apex of cavity; a fleshy ridge arising at the insertion of the vas deferens runs nearly to the base of penis. At the lower third of the penis is inserted a large, club-shaped appendix,

opening into the penis by a narrow aperture, and containing two strong longitudinal fleshy ridges (pl. 21, fig. 3). Talon coronated (pl. 21, fig. 4).

Jaw arcuate without median projection, sculptured with numerous (12-14) broad, crowded ribs, denticulating both margins, (pl. 21, fig. 5, *P. ampla*).

Radula having the central teeth tricuspid, mesocones with a long reflection, the cutting points projecting beyond the basal-plates, ectocones shortly reflected with long cutting points. Laterals similar but lacking entocones. Marginal teeth low, wide, the mesocone and ectocone both bifid (pl. 21, fig. 6, *P. griseola*).

Distribution: eastern Mexico and Texas. The species live in open fields and chaparral.

The most important anatomical features of this group are the simplicity of the female generative system, which is like *Polygyra* in its short spermatheca duct, lobed talon and other characters; the male system being also like *Polygyra* except that the retractor has a triple insertion, and the penis has a large appendix. Jaw as in *Polygyra*, section *Stenotrema*; teeth of radula as in *Polygyra*. External features also like *Polygyra*. Our knowledge of the anatomy is due to the investigations of Leidy, Binney, Semper and Pfeffer. Von Martens is in error in attributing a dart sack to this group, and in placing it as a subgenus under *Helix* s. str.; it is intimately allied to *Polygyra*, the large appendix and split penis retractor being the only anatomical features separating *Praticolella* from *Polygyra*, the texture of the shell offering another differential feature.

	<i>P. griseola</i> Pfr., iv, 76.
<i>P. ampla</i> Pfr.	<i>cicereula</i> Fér., Dh.
<i>ocampi</i> Streb. iv, 76.	<i>pisum</i> Beck.
<i>P. flavescens</i> (Wieg.) Pfr., iv,	<i>albocincta</i> Binn.
[75.	<i>albozonata</i> Binn.
<i>P. berlandieriana</i> Moric. iv, 76.	<i>albolineata</i> Gld.
<i>pachyloma</i> Mke.	<i>splendidula</i> Ant.

Genus POLYGYRA Say, 1818.

Polygyra SAY, Journ. Acad. Nat. Sci. Phila. i, p. 278 (proposed for *auriculata*, *avara* and *septemvolva*).—PILSERY, Proc. Acad. N. S. Phila. 1889, p. 193; 1892, p. 400.

Plus *Dadalocheila* BECK, Index, p. 21 (for *auriculata*, *avara* and *implicata*).—*Triodopsis* RAFINESQUE, Journ. de Phys., etc., lxxxviii,

p. 425, 1819; Ennm. and Acet. etc., p. 3, 1831 (type *Tr. lunula*, = *H. tridentata* Say). + *Menomphis* RAF., l. c.—*Xolotrema* RAF., l. c., (proposed for *X. lunula*, *X. triodopsis* and *X. clausa*, all undescribed and unidentified).—*Odotropis*, *Chimotrema* and *Toxotrema* RAF., Journ. de Phys., t. c., p. 425 (?= *Stenotrema*).—*Stenotrema* RAF., l. c. (type *S. convexa* = *H. stenotrema* Fér.).—*Aplodon* RAF., l. c. (type *A. nodosum*; undescribed and unidentified).—*Stenostoma* RAF., Enum. and Account, 1831 (type *S. convexa* Raf.). *Mesodon* RAF., l. c. (type *M. maculatum* Raf., unidentified).—*Trophodon* and *Odomphium* RAF., l. c. unidentified.—*Ulostoma* ALBERS, Die Hel. 1850, p. 95 (= *Polygyra* s. str., *Stenotrema*, *Triodopsis*, etc. Not *Ulostoma* TRYON!).—*Putera* ALBERS, l. c., p. 96 (= *Mesodon* auct.).—*Cyclo-doma* SWAINS. (part), Malacol., p. 193.—*Tridopsis* BECK, Index Moll., p. 22; GRAY, P. Z. S. 1847, p. 173, type *H. plicata*. *Helicodonta* (in part) FER., Prodrom., p. 33.—*Anchistoma* (in part) H. & A. AD., Gen. Rec. Moll. ii, p. 205, 1858.—*Angystoma* (in part) KLEIN, Tent. Meth. Ostr., p. 10, 1753 (pre-Linnæan). *Neohelix* v. IHERING, Zeitschr. f. Wissensch. Zool. liv, p. 482, 1892 (= *Polygyra* Pils.).

Conf. W. G. BINNEY, Terr. Moll. v, and STREBEL & Pfeffer, Mex. Land- u. Süßwasser-Moll. (anatomy).

Shell helicoid, varying from globose or depressed-globose to lens-shaped or planorboid, the periphery carinated or rounded; umbilicus either open or closed. Surface striated or hirsute; corneous, yellow or brown, generally unicolored, but sometimes with many bands, *the most constant being supra-peripheral*, the others when present being wholly indefinite in number and position. *Lip well reflexed; aperture typically obstructed by three teeth*,—one parietal, two upon the lip; but *any or all teeth often wanting*.

Animal externally as in *Helix*, the mantle subcentral, foot rather long and narrow, *not distinctly tripartite below*, and without longitudinal grooves above the lateral margins, although a sort of foot-margin is produced by the tessellated granulation of the edge. Surface rather coarsely irregularly granulated, the granulation finer posteriorly; back with a pair of indistinct grooves extending from mantle to facial area; *sides of foot, and sides and top of tail without any distinct oblique or longitudinal lines, irregularly granulated*; tail rounded above, obtuse behind. Mantel edge reflexed to correspond with the lip of the shell, its edge even; shell lappets none; body-

lappets small, the right one long, giving off a short ascending branch behind the lung-pore; left lappet very small, short.

Genitalia *completely lacking accessory organs*; retractor and vas deferens inserted at the apex of the penis. Spermatheca oval or oblong, *situated upon a short simple duct* (pl. 30, fig. 6, *P. troostiana*; pl. 30, fig. 12, *P. inflecta*; pl. 30, fig. 20, *P. clausa*; pl. 31, fig. 27, *P. spinosa*; pl. 21, figs. 12-16, *P. albolubris*). The penis is divided internally into two parts: (1) a lower, invertible portion, the inner surface of which shows few or many longitudinal folds, which are smooth and may be either weak or strong and acute; and (2) an upper portion the cavity of which has finely corrugated walls and is partially filled by one or two fleshy pillars adherent along the sides.

Jaw arcuate, solid and strong, sculptured with 7 to 20 strong convex ribs; cutting edge without median projection, but denticulated by the ribs (pl. 30, fig. 19, *P. sayi* Binn.; pl. 30, fig. 21, *P. kiawaensis* Simp.; pl. 21, fig. 11, *P. albolubris* Say).

Distribution: North America (exclusive of some parts of the southwestern U. S.); Cuba, Bahamas and Bermuda.

The white-lipped *Helices* of North America form a very distinct and homogeneous genus, well distinguished by characters of the shell and still more by those of the soft parts. The group, in practically its present limits, was first defined in 1889, by the writer; subsequently the European forms supposed by former authors to be allied to *Triodopsis* were shown to differ generically (Journ. de Conchyl. 1891, p. 22). Dr. H. v. Ihering has more recently discussed the genus, under the new name, *Neohelix* (Zeitschr. f. wissenschaftl. Zool. 1892, p. 482). This name must be considered superfluous, on account of the priority of no less than twenty other more or less available generic or subgeneric names proposed by various authors.

No snails referable to *Polygyra* have been found in any part of the Old World, or in South America, either living or fossil. It is therefore highly probable that the genus arose and developed its peculiarities upon eastern North American soil. The West Indian species are to be regarded as stragglers from the continental fauna, just as *Hemitrochus*, *Liguus* and *Thysanophora* in Florida are emigrants from the Antillean fauna. A former connection between southern Florida and the Great Antilles is demonstrated by the Pliocene fauna of the former; but the connection was probably not direct,

but by way of the Bahama bank, which had previously been connected with Cuba and Haiti.

The question of the relationships of *Polygyra* is beset with difficulties. I had formerly grouped the genus with *Pyramidula*, etc. but the characters of the foot preemptorily forbid such association. Dr. v. Ihering suggests the possibility that it may be either a modified branch of *Arionta* in which the genitalia have become simple by degeneration, or a further development of *Patula*. The latter hypothesis is untenable. The former has as yet no facts to support it.

No fossils now known throw light upon the problem. From what we know of the living forms of *Polygyra*, it is likely that their common ancestor possessed a shell with tridentate aperture, reflected lip, and a color-band above the periphery. It is not unlikely that the group represents an early stage of the true *Helix* phylum, which did not share the evolution of the accessory organs of the genitalia now characteristic of the *Pentatænia*, *Campylæa*, *Cochlostyla*, etc.

Polygyra divides into three sections, typically very distinct in appearance, but closely connected by more or less intermediate species. The anatomy is practically the same throughout.

Section *Polygyra* Say, (restricted).

Shell depressed; umbilicated, or having a curved groove caused by the tangential deviation of the last whorl. Aperture somewhat kidney-shaped or ear-shaped, *the lip continued in an elevated v-shaped callus across the parietal wall*; outer lip having two teeth or none. Type *P. septemvolva* Say, pl. 30, figs. 1, 2, 3. (See also pl. 30, fig. 4, *P. auriculata* Say).

Central teeth tricuspid, the side cusps well developed; laterals bicuspid; marginal teeth generally having the mesocone bifid at tip, at least on the extreme margin of the radula, ectocone simple (pl. 30, fig. 5, *P. septemvolva*; pl. 30, fig. 7, *postelliana*). Genital system as described above (pl. 30, fig. 6, *P. troostiana*).

This section comprises some very aberrant species, but the extremes are so closely connected by intermediate forms that no useful subdivisions can be maintained. The synonymy of the restricted section *Polygyra* comprises the names *Dædalocheila*, *Ulostoma* and *Cyclodoma*.

The species inhabit the Southern States, a few ranging as far north as South Carolina, Kentucky and Missouri, extending southward throughout Mexico. In the West Indies species are found in the

Bermudas, Bahamas and Cuba. Most species, such as *cereolus*, *auriformis*, *mooreana*, etc. are gregarious, and occur in great numbers. All are ground snails, living at the roots of grass, or under bits of wood or leaves; and while some forms such as *auriformis* are found only in the immediate proximity of water, others occur in very dry situations, the arid mesquite chaparral of southern Texas being inhabited by *texasiana* and *mooreana*.

Species without teeth on the outer lip.

Bland has published an excellent essay upon these forms in *Annals N. Y. Lyceum* vii, 132, 1860, but his material was not extensive enough to show the intermediate forms now known. The forms included under *P. cereolus* are absolutely connected by a series of transitions, in which the supposed specific characters found in the striation or ribbing, the degree of carination, number of whorls, form of umbilicus and presence or absence of an internal lamina, blend by imperceptible degrees.

The typical *cereolus* is found on the Florida keys and adjacent mainland; it passes into the smaller form *carpenteriana*, which continues up the coast, mainly westward; occurring also at Matanzas, Cuba! In central and eastern Florida *septemvolva* occurs, its small race *volvoxis* spreading north to St. Simon's I., Georgia, and to the west (under the name *febigeri*) it occurs at New Orleans, La., and Galveston, Texas. Var *microdonta*, which is typically quite distinct in its fine striation, occurs abundantly in Bermuda, and also on New Providence (at Nassau), Bahamas. At the latter locality transition forms occur; and it must also be noted that some specimens of *volvoxis* from Florida (Tampa) and *carpenteriana* (Key Biscayne) show striation equally fine. Species of this group inhabit the neighborhood of the sea, and generally occur in great numbers. Besides the species enumerated below there is another *Polygyra* with toothless outer lip, *P. anilis*; but its relationships are with an entirely different group of forms.

(Key to species and varieties).

- a. Parietal tooth minute, not connected with columellar lip by a raised callus; no internal lamina. *paludosa*.
- aa. Parietal tooth connected with a raised parietal callus.
 - b. Internal lamina present; upper surface strongly ribbed.
 - c. Size large; whorls 7-10. *cereolus*.

- cc. Size small ; whorls 6, the last contracted in its first half,
its last half notably swollen. *carpenteriana*.
bb. No internal lamina.
c. Upper surface coarsely ribbed.
d. Size large, whorls 7 or more. *septemvolva*.
dd. Size smaller, whorls $5\frac{1}{2}$ –7, *volvoris*.
ee. Upper surface very finely striated. *microdonta*.

- | | |
|-----------------------------------|------------------------------------|
| P. cereolus Mühlf., iii, 128. | Var. microdonta Desh. |
| <i>laminifera</i> W. G. B. | <i>delitescens</i> Shutt., undesc. |
| f. carpenteriana Bld. | <i>cheilodon</i> Say, Bld. |
| <i>microdonta</i> W. G. B., olim. | ? <i>plana</i> Dkr. |
| f. septemvolva Say. | P. paludosa Pfr. iii, 129. |
| <i>planorbula</i> Lam. | <i>lingulata</i> Fér., Dh. |
| <i>polygyrata</i> "Binn." Pfr. | <i>ramonis</i> d'Orb. |
| f. volvoxis Pfr. | <i>ramondi</i> d'Orb., Atlas. |
| <i>febigeri</i> Bld. | <i>insularum</i> Beck, undesc. |
| f. floridana Hemph. | ? <i>burdenflehtii</i> B., Villa. |

Species with teeth on the outer lip.

With the exception of *P. johannis* of Cuba, the species of this section are all continental. The *auriculata* series inhabits the southern tier of Gulf States, from Florida to Texas ; the *dorfeuilliana* series is confined to the more or less mountainous region south of the Ohio River, from Tennessee to Oklahoma ; the *texasiana*—*acutedentata* series is from Mexico, extending into Texas along the northern continuation of the Sonoran fauna and flora.

- | | |
|---------------------------------|------------------------------------|
| P. auriculata Say, iii, 137. | P. postelliana Bld., iii, 137. |
| v. microforis Dall, iii, 138. | P. espiloca (Rav.) Bld., iii, 136. |
| P. uvulifera Shutt., iii, 137. | P. avara Say, iii, 136. |
| <i>florulifera</i> Rve. | P. pustula Fér., iii, 131. |
| P. auriformis Bld., iii, 137. | P. pustuloides Bld., iii, 132. |
| ? <i>sayii</i> Wood, DeKay. | P. leporina Gld., iii, 131. |
| | * * * |
| | P. fastigans Say, iii, 131. |
| P. hazardi Bld., iii, 131. | <i>fatigiata</i> Say. |
| <i>plicata</i> Say. | <i>fastigiata</i> DeK. |
| ? <i>finitima</i> Dh. | P. jacksoni Bld., iii, 134. |
| P. dorfeuilliana Lea, iii, 133. | v. deltoidea Simp., viii, 152. |
| v. sampsoni Weth., viii, 152. | P. troostiana Lea, iii, 131. |

(the portion everted during copulation) is smooth inside (fig. 15); it extends upward in a sort of sheath over the base of the upper portion (figs. 12, 15). This sheath is what Leidy and Binney call the "prepuce." The upper portion has fleshy walls which are densely corrugated or subgranulated within, and the cavity is almost filled by a thick longitudinal corrugated column, adnate throughout its length to one side (fig. 15, penis slit open longitudinally; fig. 13, 14, transverse sections of penis with fleshy column). At the apex of the cavity there is a perforated papilla (pl. 21, fig. 13, transverse section), free at its lower end. The retractor muscle is inserted on the vas deferens a short distance above the apex of penis; its distal end being attached to the floor of the lung cavity. The lower part of the spermatheca duct (pl. 21, fig. 15) is swollen, with fleshy walls which inside are strongly corrugated lengthwise (pl. 21, fig. 16, transverse section).

Distribution: Eastern North America from Canada to Florida, west to central Texas and Dakota; in the northwest occurring in Idaho, and on the Pacific slope from Sitka to Santa Cruz, California. Most of the species live around decaying logs or under and upon decaying leaves in forests. Some, like *multilineata* occur in great numbers on the low, weedy, willow covered flood-plains of rivers; others, like *profunda*, prefer shady, leaf-carpeted and rocky hill-sides. *P. dentifera* and *P. palliata* are found under the loosened bark of hemlock boles, sharing these retreats with *Philomyces*. Most species come from their hiding-places in the warm days of early spring, and during rainy weather in summer. They may then be found crawling upon the dead leaves, or ascending nettles, etc., the leaves of which they eat. In sunny days after rain, they are found adhering to the lower surfaces of nettle leaves. They never ascend trees.

The species enumerated below have been divided by authors into two sections, *Triodopsis* and *Mesodon*; but such division seems to be artificial. Some species of *Triodopsis* are known to have varieties lacking lip-teeth, and these would technically fall into *Mesodon*. In other cases, such as the group of Idaho and Washington species, all the transitions from tridentate to toothless apertures occur. The group of *P. appressa* is also a transition group. Tryon has resuscitated the section-names *Xolotrema* and *Ulostoma*. The first of these is a Rafinesquian name totally unidentifiable; the second was proposed by Albers for species of *Polygyra* s. s. and *Triodopsis* s. s., and

did not include either of the forms Tryon uses the name for! *Aplodon*, Raf., has also been used in this connection; it is positively unidentifiable.

Species.

- | | |
|---|--|
| P. tridentata Say, iii, 143. | v. obsoleta Pils. |
| <i>lunula</i> Raf. | P. hopetonensis Shutt. iii, 144. |
| v. juxtidentens Pils. | <i>ephabus</i> Say, ms. |
| v. edentilabris Pils. | P. vaanostrandii Bld., iii, 145. |
| P. fraudulentula Pils. | P. vultuosa Gld., iii, 144. |
| <i>fallax</i> auct., not Say, iii, 143. | v. henriettae Maz., iii, 144. |
| P. fallax Say. | <i>copei</i> Weth., iii, 144. |
| <i>introferens</i> Bld. iii, 145. | v. cragini Call, iii, 144. |
| * * * | |
| P. rugeli Shuttlw., iii, 147. | P. edentata Samp., viii, 154. |
| P. inflecta Say, iii, 146. | <i>edentula</i> W. G. B. |
| * * * | |
| P. mullani Bld., iii, 145. | P. columbiana Lea, iii, 154. |
| v. hemphilli W. G. B., iii, 146. | v. labiosa Gld. |
| <i>binominata</i> Tryon, iii, 146. | v. armigera Anc., viii, 155. |
| <i>olneyae</i> Pils. | P. roperi Pils., viii, 154. |
| v. blandi Hemph. | P. loricata Gld., iii, 145. |
| v. harfordiana W. G. B., iii, | <i>leontii</i> Lea. |
| <i>commutanda</i> Anc. [146. | P. levettei Bld., iii, 143. |
| <i>salmonensis</i> Tryon, iii, 146. | <i>thomsoniana</i> Anc. |
| v. oregonensis Hemph. | <i>orobæna</i> Anc. |
| P. devia Gld., iii, 154. | |
| <i>baskervillei</i> Pfr. | |
| * * * | |
| P. profunda Say, iii, 155. | P. kiowaensis Simp., viii, 155. |
| <i>richardi</i> Fér. | v. arkansaensis Pils., viii, 156. |
| ? <i>bulbina</i> Dh. | P. townsendiana Lea, iv, 72. |
| P. sayii Binn., iii, 155. | <i>pedestris</i> and <i>ruida</i> , Gld. |
| <i>diodonta</i> Say, not Mühlf. | v. ptychophora A. D. Br., iii, |
| v. chilhoweensis Lewis, iii, | [154. |
| [155. | f. castanea Hemph. |
| * * * | |
| P. albolabris Say, iii, 150. | v. traversensis Leach. |
| <i>rufa</i> DeK. | v. major Binn., iii, 150. |
| v. maritima Pils. | |

<i>P. andrewsi</i> W. G. B., iii, 150.	<i>P. divesta</i> Gld., iii, 152.
<i>P. exoleta</i> Binn., iii, 151.	<i>dejecta</i> and <i>abjecta</i> Gld.
<i>zaleta</i> Binn., <i>olim.</i>	<i>P. wetherbyi</i> Bld., iii, 152.
<i>P. multilineata</i> Say, iii, 150.	<i>P. roemeri</i> Pfr., iii, 152.
	<i>P. dentifera</i> Binn., iii, 152.
*	* *
<i>P. appressa</i> Say, iii, 148.	<i>P. obstricta</i> Say, iii, 148.
<i>linguifera</i> Lam.	<i>helicoides</i> Lea.
v. <i>perigrapta</i> Pils.	v. <i>carolinensis</i> Lea, viii, 153.
<i>P. sargentiana</i> J. & P., viii, 153.	<i>P. palliata</i> Say, iii, 147.
<i>sargenti</i> J. & P., not Bld.	<i>denotata</i> Fér.
<i>P. subpalliata</i> Pils.	<i>notata</i> Dh.
*	* *
<i>P. elevata</i> Say, iii, 148.	<i>P. clarki</i> Lea, iii, 149.
<i>tennesseensis</i> Lea.	<i>P. pennsylvanica</i> Green, iii, 151.
<i>knoxvilliana</i> Fér.	
*	* *
<i>P. thyroides</i> Say, iii, 152.	<i>P. christyi</i> Bld., iii, 151.
<i>thyroidus</i> Say.	<i>P. mitchelliana</i> Lea, iii, 151.
v. <i>bucculenta</i> Gld., iii, 153.	<i>P. downieana</i> Bld., iii, 153.
<i>P. clausa</i> Say, iii, 153.	<i>P. lawi</i> Lewis, iii, 153.
<i>ingallsiana</i> Shutt.	<i>P. mobiliana</i> Lea.
<i>jugallsiana</i> Alb.	<i>P. jejuna</i> Say, iii, 153.
<i>P. wheatleyi</i> Bld., iii, 151.	

Section *Stenotrema* Rafinesque.

Shell small, *compact*, imperforate or umbilicate; subglobose, globose-depressed or lens-shaped the periphery varying from rounded to acutely keeled; *surface dull, smooth, generally hairy*. Whorls 5–6, *closely revolving*, the last suddenly deflexed in front. *Aperture basal, narrow, obstructed by an oblique blade-like parietal tooth parallel to the reflexed basal lip*, the latter often notched in the middle. Last whorl generally having in its last fourth a short transverse partition on the axis. Type *P. stenotrema* Fér. (see pl. 31, figs. 22, 23, 24, *P. monodon* var. *alicie*).

Animal externally as in *Triodopsis*.

Genital system having the penis notably longer than the receptaculum seminis and its duct, the latter being quite short (pl. 31, fig. 27, *P. spinosa*).

Jaw having the ribs wide and rather more crowded than is usual in the other sections of the genus (pl. 31, fig. 25. *P. monodon*).

Radula having ectocones developed on all the teeth ; basal plates short and square, slightly shorter than the mesocones of central and lateral teeth ; marginals with the basal plates short, wide, mesocone bluntly bifid at tip, ectocone simple or bluntly bifid (pl. 31, fig. 26, *P. hirsuta*).

Distribution: Entire Gulf and Atlantic drainages, north to Canada and south to southern Texas (San Antonio) ; Oregon. The species live under and around decaying logs and bits of wood.

This is a well-marked section, distinguished by the compact narrow-mouthed shell as well as the crowded, wide ribs of the jaw. The hairs of the shell collect a coat of earth, which renders the snails difficult to see, the dusky shade of the animal also assimilating their color to the surrounding earth or rotten wood. *P. monodon* ranges over nearly all of eastern North America ; *P. hirsuta* has almost as wide a distribution ; but the other species are rarer and more local ; *P. maxillata*, *barbigera*, *edwardsi*, *edgariana*, *labrosa* and *spinosa* being confined to certain localities in the Cumberland system of mountains. *P. germana* is found in Oregon, but it may prove related to the *mullani* group of *Triodopsis*, rather than to *Stenotrema*.

Species of Stenotrema.

<i>P. spinosa</i> Lea, iii, 141.	<i>P. hirsuta</i> Say, iii, 140.
<i>P. labrosa</i> Bld., iii, 141.	? <i>porcina</i> Say.
<i>P. edgariana</i> Lea, iii, 141.	v. <i>altispira</i> Pils.
<i>P. edwardsi</i> Bld., iii, 141.	<i>P. maxillata</i> Gld., iii, 141.
<i>P. barbigera</i> Redf., iii, 142.	<i>P. monodon</i> Rack., iii, 142.
<i>P. stenotrema</i> Fér., iii, 140.	v. <i>fraterna</i> Say, iii, 142.
<i>hirsuta</i> var. <i>a.</i> Fér.	v. <i>aliciae</i> Pils., viii, 152.
<i>convexa</i> Raf.	v. <i>cincta</i> Lewis, viii, 152.
v. <i>subglobosa</i> Pils., viii, 152.	<i>P. leai</i> Ward, iii, 142.
	<i>P. germana</i> Gld., iii, 143.

Genus POLYGYRELLA Binney, 1863.

= *Polygyrella* Binn. & Bld. + *Ammonitella* Cooper.

Shell discoidal, openly umbilicated, the *spire slightly convex, flat, or concave* ; *texture glassy*, somewhat translucent. Aperture sub-

triangular or crescentic, *the lip not in the least expanded*, blunt, *thickened within the edge* by a white rim, simple or two-toothed; parietal wall smooth or with an erect tooth. Type *P. polygyrella*, pl. 31, figs. 28, 29, 30.

External anatomy unknown. Genital system (in *P. polygyrella*, the only species yet investigated) *without accessory organs*, like that of *Polygyra* (pl. 31, fig. 31).

Jaw low and wide, with no median projection, having numerous strong vertical ribs, denticulating its margins (pl. 31, fig. 32).

Central teeth tricuspid, laterals bicuspid, marginal teeth bicuspid, the ectocone simple or bluntly bifid (pl. 31, fig. 41).

Distribution: California, Washington, Idaho and Montana.

The anatomy of the species of this genus is, as far as it is known, the same as in *Polygyra* except that the jaw is wider with more ribs. The shell differs from *Polygyra* in its absolutely unexpanded blunt lip and its glassy texture. It may be distinguished from the Palearctic genus *Gonostoma* by the characters of the shell just mentioned (*Gonostoma* having an opaque shell with expanded or reflexed lip), and by the simplicity of the generative system. The relationship of *Polygyrella* to *Polygyratia* cannot be decided until the anatomy of the South American genus is made known.

[*Note*.—Mr. Binney's classified Synopsis of North American land shells, in which the name *Polygyrella* first appeared, is referred to as "a mere proof" by Professor Joseph Henry, Secretary of the Smithsonian Institution, who adds that it "should not be quoted as authority or referred to as a published work." This suggestion cannot be followed. The Synopsis is not in any ordinary sense a proof-sheet. A large edition of it was printed and widely circulated, as an official publication of the Smithsonian Institution.]

Subgenus POLYGYRELLA Binney, 1863.

Polygyrella BINNEY, Smithsonian Miscellaneous Collections, no. 000, p. 5, Dec. 9, 1863 (no description; type *H. polygyrella*).—*Polygyrella* Bland, BINNEY & BLD., in Land and Fresh-Water Shells of North America, p. 112, type *H. polygyrella* Bld. & Coop. —W. G. BINNEY, Terr. Moll. v, p. 289 (jaw and dentition), and Second Supplement to the same, p. 36 (genitalia).—PILSBRY, Proc.

Acad. Nat. Sci. Phila. 1890, p. 300.—*Adelodonta* ANCEY, Le Naturaliste, Dec., 1880, p. 334, type *H. polygyrella*.

Shell *disk-shaped*, the spire flat or nearly so, *periphery rounded, even in the young*; umbilicus wide within, showing all the whorls; *texture somewhat glassy* and subtranslucent, polished beneath; color yellow, greenish or light brown; whorls 6–8, narrow, slowly widening, the last slightly descending in front. Aperture subtriangular, oblique; *peristome blunt, not expanded, thickened within*, with or without lip-teeth or internal teeth; parietal wall bearing an erect triangular tooth. Type *P. polygyrella*, pl. 31, figs. 28, 29, 30, (see also pl. 31, figs. 33, 34, 35, *P. harfordiana*, enlarged).

Jaw very wide, arcuate, without median projection below; surface with numerous (17–36) broad, slightly separated ribs, denticulating either margin (pl. 31, fig. 32, *P. polygyrella*).

Radula long and narrow, with teeth according to the formula 22. 5.1.5.22. Teeth as in *Polygyra*, the centrals tricuspid the mesocone longer than the basal-plate; laterals bicuspid, marginals bicuspid, the ectocone bifid on the outer teeth (pl. 31, fig. 41, *P. polygyrella*).

Genital system like that of *Polygyra*, but having the duct of the spermatheca rather longer (pl. 31, fig. 31, *P. polygyrella*).

This group agrees with *Polygyra* in essential features of dentition, jaw and genitalia; it differs from that group in the glassy texture of the shell and its *totally unreflexed* lip. The texture of the shell is like *Systrophia*, but that South American type has the lip-edge slightly expanded.

P. polygyrella Bld. & Coop., iii, 129. Cœur d'Alêne Mts., Idaho.

P. harfordiana Coop. iii, 130. Fresno Co., California.

Subgenus AMMONITELLA Cooper, 1869.

Ammonitella J. G. COOP., Amer. Journ. of Conch. iv, p. 209. (Issued February 4, 1869).—*Gonostoma* W. G. BINNEY, Terr. Moll. v, p. 261.

Shell *Ammonite* shaped, with *sunken, concave spire*, and open umbilicus showing all the whorls; periphery broadly rounded; *texture glassy, subtranslucent*; whorls about 6, *very narrow and very closely revolving, the last whorl embracing the greater part of the preceding*, deflexed in front, its suture somewhat tangentially produced.

Aperture narrowly crescentic; lip blunt, thickened within except toward the upper termination, *not in the least expanded*, toothless; parietal wall toothless. Type *P. yatesi* Coop., pl. 20, figs. 32, 33, 34.

External characters and genitalia of animal unknown.

Jaw low, wide, slightly arcuate, without median projection below; surface with a strong transverse line of reinforcement, and about 12 wide crowded ribs, denticulating either margin (pl. 36, fig. 12, *P. yatesi*).

Radula long and narrow; teeth after the formula 18.6.1.6.18. Teeth like those of *Polygyrella*, but ectocone of marginals simple (pl. 36, fig. 11, *P. yatesi*).

This group has been united with the European genus *Gonostoma*, but erroneously. It is readily distinguished from that type by the non-expanded lip and glassy texture of the shell. The dentition also differs widely. The genital organs of *Gonostoma* present characteristic features, but as the soft anatomy of *Ammonitella* is unknown, no comparison can now be made. The American species will be found to have the genitalia simple, as in *Polygyrella*, if my estimate of its affinities proves to be correct.

P. yatesi Coop., iii, 115. Calaveras Co., California.

yatesiana W. G. B., *olim*.

Genus POLYGYRATIA Gray, 1847.

Polygyratia GRAY, Proc. Zool. Soc. Lond., 1847, p. 173, type *H. polygyrata*.—*Ophiogyra* ALBERS, Die Hel. 1850, p. 91, type *H. polygyrata* Born.—*Systrophia* PFR., Malak. Blätter, ii, 1855, p. 136, for *H. helicycloides*, *systrophia*, *helignoidea*.—*Entodina* ANCEY, Conchologists' Exch., i, p. 64, May, 1887, type *H. reyesi*.

Shell *disk-shaped*, flat or nearly so above, concave beneath, composed of 5–10 narrow, closely coiled whorls, equally visible above and below, the last descending in front. Aperture oblique, rounded or subtriangular, the lip generally narrowly expanded, sometimes toothed; parietal callus inconspicuous or raised into a tooth-like process. Type *H. polygyrata* Born, pl. 20, figs. 37, 38.

Animal unknown. The species are said to live in forests. The typical subgenus is confined to the central portions of South America. The affinities of the genus are problematical. It may perhaps prove to be allied to *Polygyrella*.

A number of forms agreeing with *Polygyratia* in general characters of the shell are found in Papua and New Ireland. Whether they have actual affinity to the South American types can be decided only by an examination of the soft parts. The excessively peculiar shell argues great antiquity for the group; and the somewhat similar distribution of Marsupials and Struthious birds suggests the theory of an ancient migration in the case of *Polygyratia*. Such a theory, however, rests on no known facts of palæontology or anatomy.

Subdivisions.

Subgenus I. POLYGYRATIA Gray.

Shell having the whorls rounded at the periphery, the spire flat or concave. South American. Three sections, showing slight differences have been named:

Section *Polygyratia*. Last whorl provided with an internal barrier of short spiral lamellæ; parietal callus thin, appressed.

Section *Systrophia*. Last whorl without internal laminæ; parietal callus thin, appressed.

Section *Entodina*. Last whorl without internal laminæ; edge of parietal callus raised, connecting the ends of the lip, and forming a sort of parietal tooth.

Subgenus II. COXIA Ancy.

Shell having the whorls flat above, acutely keeled at the shoulder; spire subconcave, flat, or conical. Papuan region.

Subgenus I. POLYGYRATIA Gray.

Section *Polygyratia* Gray (restricted).

Shell solid, typically with opaque dark coloring; lip expanded, its margin toothless; parietal callus thin, appressed, body-whorl having an internal barrier of short spiral lamellæ, on both outer and parietal walls. Type *P. polygyrata*, pl. 20, figs. 37, 38.

The internal lamellæ are like those of *Corilla*.

P. polygyrata Born, iii, 124.
charybdis Mörch.

P. quinquelirata Sm., viii, 150.
P. pollodonta d'Orb., iii, 126.

Section *Systrophia* Pfr., 1855.

Shell yellowish or corneous, thin, the lip slightly expanded, often having one or two teeth; *parietal callus slight, not elevated* nor toothed; *no internal lamellæ*. Type *P. helicycloides* d'Orb. (see pl. 20, figs. 41, 42, 43, *P. stenogyra*).

Distribution: Brazil, Bolivia, Equador, Peru.

- | | |
|--|---|
| <i>P. calculina</i> Pfr., iii, 125. | <i>P. pseudoplanorbis</i> Lub., iii, 126. |
| <i>calculus</i> Pfr. not Lowe. | <i>P. stenogyra</i> Pfr., iii, 124. |
| <i>P. decagyra</i> Phil., iii, 125. | <i>P. stenostrepta</i> Pfr. |
| <i>P. gyrella</i> Morel., iii, 126. | <i>P. systropha</i> Alb., iii, 127. |
| <i>P. helicycloides</i> d'Orb., viii, 150. | <i>P. tortilis</i> Morel., iii, 125. |
| <i>P. ortonii</i> Crosse, iii, 127. | <i>P. wallisiana</i> Mouss., iii, 126. |
| <i>P. polycycla</i> Morel., iii, 125. | |

Section *Entodina* Ancey.

Shell planorboid, many whorled; lip narrowly expanded, toothless or toothed, its ends connected across the parietal wall by an elevated, toothed callus. Type *P. reyrei* Souv., pl. 20, figs. 39, 40.

Distribution same as *Systrophia*.

The parietal callus is shaped somewhat like that of *Polygyra cereolus*.

- | | |
|---|--|
| <i>P. cheilostropha</i> d'Orb., iii, 128. | <i>P. janeirensis</i> Pfr., viii, 150. |
| <i>P. entodonta</i> Pfr., iii, 126. | <i>P. platygyra</i> Alb. |
| <i>P. heligmoidea</i> d'Orb., iii, 125. | <i>P. reyrei</i> Souv., iii, 127. |

Subgenus? II. *COXIA* Ancey, 1887.

Coxia ANC., Conchologists' Exchange, i, p. 75, June, 1887. Type *Helix macgregori* Cox.—*Calostropha* ANC., Conch. Exch. ii, p. 38, Sept., 1887. Type *Helix raffrayi* T.-C.

Shell many (about 10) whorled, the volutions *acutely carinated at periphery* or shoulder, equally visible above and below. Spire either flat, slightly concave, or conoidal. Aperture oblique, subquadrangular, the lip expanded and slightly thickened, its ends connected by a parietal callus. Type *P. macgregori*, pl. 20, figs. 44, 45, 46.

Soft parts of animal unknown.

The shells in this group differ from those of the South American many-whorled *Helices* in the flat upper surface of each whorl, and its acute peripheral keel.

Helix multispirata Hombr. & Jacq. (Manual, iii, 127) and *H. microphis* Crosse, have been referred to *Polygyratia* by authors. The first is probably a *Charopa*. The other has been made the type of a group *Microphyura* by Ancey (Bull. Soc. Mal. Fr. v, 375). It belongs to the genus *Diplomphalus* in Rhytididæ (Manual i, p. 114).

Species.

P. macgregori Cox, iii, 127. New Ireland.

P. raffrayi Tap.-Can., iii, 128. Western New Guinea.

* * *

The series of genera next to be considered comprises a majority of the large, solid-shelled Helices of the tropics and southern hemisphere, both in the Old World and America. All discussion of this and other primary divisions of the Helices is reserved for the introductory portion of this volume, but certain brief notes may be of use in this place. These genera share certain peculiarities of the generative system: *the female branch is without dart sack or other accessory organs; the male side has the penis continued beyond its papilla-bearing apex in a narrow tube called the "epiphallus," which terminates in a flagellum and vas deferens.* In most forms the epiphallus is as long or longer than the penis itself; but in some (such as *Thelidomus*) it is so shortened as to be inconspicuous, or even absent. In *Cristigibba* this process of shortening has resulted in the complete degeneration of both epiphallus and flagellum. In these and similar cases we must not mistake the structure resulting from degeneration for a primitive condition. Such an error would be like holding *Ancylus* to be a primitive gastropod on account of its (at present) non-spiral shell, or like grouping the limbless lizards, *Anguis* or *Amphisbæna* with the snakes.

In the American forms the penis retractor is inserted upon the penis; in the Asiatic and Australian it is usually upon the epiphallus.

The jaw is generally stoutly ribbed, but often by degeneration of the ribs, smooth; and this modification is certainly in some cases not a generic or even subgeneric character.

Genus PLEURODONTE Fischer de Waldheim, 1808.

= *Pleurodonte* + *Lucerna* + *Dentellaria* + *Caracolus* + *Isomeria* + *Labyrinthus* + *Polydontes* + *Thelidomus* + *Liochila* + *Eurycratera*, etc., of authors.

Shell imperforate or umbilicate, rather large and solid, varying from globose-depressed to lens-shaped, the periphery rounded or keeled; surface striate or granular. Whorls 4 to 6. Aperture with or without teeth, the lip more or less expanded or reflexed. Eggs rather large, oval, hard-shelled, the newly hatched young having a shell of 2 to $2\frac{1}{2}$ whorls. Type *P. sinuata* Müll. (See pl. 22, figs. 1 to 10; pl. 25, all figs except fig. 9.)

Animal having the sole undivided; lateral edges of foot with no traces of foot margin; tail rounded, convex above; sides of foot with granules arranged in oblique rows or irregular; back with some indistinct longitudinal lines or none; mantle-edge generally having small body lappets.

Jaw solid, arcuate, with blunt ends, and either smooth with a slight median projection, weakly ribbed, or with strong rounded ribs on its median moiety (plates 21, 24, 26).

Teeth of radula in nearly straight transverse rows; central and lateral teeth unicuspid, the lateral expansions of the cutting point occupying the place of ectocones, or having side cutting points developed. Marginal teeth either unicuspid or having a bifid mesocone and a simple or bifid ectocone (plates 21, 24, 26).

Genitalia: Penis large, muscular, having *the retractor* and *epiphallus inserted at its apex*; interior with many longitudinal folds and usually a papilla; sometimes provided with a short appendix. Epiphallus varying from long to very short, *ending in a short flagellum*. *Female system lacking all accessory organs*.

Distribution, West Indies and northern South America. All of the species are ground snails.

The essential features of this genus are anatomical: (1) the insertion of the retractor on the penis itself; (2) the continuation of the penis in an epiphallus, into which the vas deferens enters, and which terminates in a flagellum; (3) the entire simplicity of the female system as in *Pyramidula* or *Polygyra*; (4) the rather large, hard-shelled eggs; (5) the tendency of the teeth to develop mesocones at the expense of ectocones.

The jaw varies from the ribbed (odontognathous) to the smooth (oxygnathous) type. The shell exhibits a wide range of variation in the several sectional groups; but notwithstanding the considerable variations of both shell and soft parts, the genus is a well characterized one, the forms being unquestionably of common ancestry, al-

lied by a strong bond of affinity, and well distinguished from all other recent genera.

The genus stands isolated in the New World fauna, its relationships being decidedly with the groups of China, the East Indies, Papua and Australia. Its advent in Middle America is one of the most interesting problems in *Helix* distribution. The solution of this mystery is not lightened by the known distribution of *Glandina*, *Clausilia*, etc., in both the Old and the New Worlds, for no shells in the least allied to this genus of large *Helices* have been found in European tertiary strata.

A thorough study of the nomenclature of this group reveals the necessity of several unwelcome but apparently inevitable changes. The well known generic name *Caracolus*, must be replaced by *Pleurodonte*, which was proposed and defined in a perfectly proper and regular manner by Fischer de Waldheim. It is impossible to use the anonymous, undefined name *Lucerna*, of Humphrey's sale catalogue *Museum Calonnianum*, unless we disregard the universally recognized canons of nomenclature.

Subdivisions.

Pleurodonte may be divided primarily into two subgenera, each of which is split into several minor groups or sections. The latter are practically impossible to recognizably define in words, although not difficult to learn by sight. It will readily be understood, therefore, that no great importance attaches to these lesser groups. They are the natural result of late geological changes in the West Indies, which broke the parent stock into island colonies. The whole series tells clearly of a former period of greater elevation of the Antillean region, and closer connection with the middle American mainland. The fact that all of the main modifications are found upon the greater Antilles would lead us to believe that here the group first became established; that the Caribbees were peopled from the northwest, and the mainland of South America also from the north; and that the sections grouped below under subgenus *Polydontes* are a later modification of the stock, which took place subsequent to the migration to the southward. The full understanding of the distribution of these *Helices*, awaits the explanation by geologists of the main orographic changes of the West Indies during tertiary time—an inquiry beset with difficulty, and as yet but little understood.

Subgenus PLEURODONTE Fischer.

Shell generally solid, dark, depressed and opaque, the aperture generally toothed. Genitalia characterized by the long epiphallus, and lack of appendix on the penis.

Section 1, *Pleurodonte* (*sensu stricto*). Shell granulate, at least above; imperforate; aperture with compressed teeth on the basal lip only, or if not toothed the shell is not acutely keeled. Jamaica.

Section 2, *Caprinus* Montf. Shell solid, imperforate, with thickened peristome, sometimes armed with nodular teeth. Lesser Antilles.

Section 3, *Gonostomopsis* Pils. Shell thin, hirsute, umbilicate; aperture trilobate-lunar, outer and basal lips each with a tooth.

Section 4, *Caracolus* Montf. Shell large, solid, carinated; aperture lacking teeth. Cuba, Haiti, Porto Rico.

Section 5, *Isomeria* Alb. Shell depressed, large, dark, solid, not acutely keeled; aperture generally with small teeth. Ecuador, Columbia.

Section 6, *Labyrinthus* Beck. Shell carinated, depressed, with an entering parietal lamella and two processes on the basal lip.

Subgenus POLYDONTES Montf.

Shell depressed or globose, often light colored or variegated with many bands, the aperture generally toothless. Genitalia having the epiphallus very short or obsolete, and often with a swollen appendix near the base of the penis.

Section 7, *Thelidomus* Swains. Shell globose-depressed, baso-columnellar lip of the peristome wide and plate-like, sometimes toothed; aperture otherwise lacking teeth.

Section 8, *Polydontes* Montf. Shell large, depressed, carinated; aperture toothless or with nodular teeth on the peristome; lip thick.

Section 9, *Parthena* Alb. Shell capacious, unicolored or multilineate. Aperture large, toothless; lip expanded.

Section 10, *Luquillia* Crosse. Shell similar, but dark colored, with conoidal spire.

Section 11, *Eurycratera* Beck. Shell large, globose, with few whorls. Aperture very large, toothless.

Section 1, *Pleurodonte* Fischer de Waldheim.

Pleurodonte F. de W., Tab. Synopt. Zoogn. p. 129 (Moscow, 1808); proposed for *H. sinuata* Gm., *lychnuchus* Gm., *lucerna* Gm.,

inaequalis Fisch., *lapicida* L., *isognomostomos* Gm.—*Pleurodonta* BECK, Index Molluscorum p. 33, and of subsequent authors.—*Dentellaria* SCHUMACHER, Essai d'un Nouv. Syst. des Hab. des Vers Test., p. 69, 230, proposed for *D. globularis* Schum. (undescribed and unfigured) and *D. sinuata* Mull. (1817).—*Lucerna* "Humph." SWAINS., Malacology, p. 329 (in part).—Man. of Conch. v. p. 97.—Not *Lucerna* Humphrey, Museum Callonianum p. 61, 1797.

Shell imperforate or umbilicated, solid, opaque, varying from subglobose to lens-shaped; surface densely granulated, at least above. Whorls $4\frac{1}{2}$ –6, the last deflexed in front. Aperture wider than high; peristome broadly expanded, toothless or having from one to five teeth upon the basal lip; parietal wall calloused but without teeth. Type *P. sinuata* Müll. (See pl. 25, figs. 6, 7, *P. sloaneana* var. *vendryesi*; pl. 25, fig. 8, *P. acuta* var. *nobilis*.)

Animal having the sole undivided, foot edge with no trace of border; tail rounded behind; back with a few indistinct grooves from mantle to head, the sides irregularly granulated.

Genital organs as in *Caprinus*. Penis stout, cylindrical, the retractor muscle and epiphallus inserted at its apex; epiphallus long, flagellum short. Spermatheca oval, situated on a long duct (pl. 24, fig. 5, *P. invalida*; pl. 24, fig. 6, *P. acuta*).

Jaw arcuate, solid, having unequal, strong, rounded ribs denticulating both margins, the ends blunt and free from ribs (pl. 24, fig. 4, *P. acuta*).

Dentition as in *Caprinus*. Central and lateral teeth having the mesocones large and long, expanded laterally. Marginal teeth having an oblique cusp, formed by the united ento-, meso- and ectocones, which are indicated by slight notches (pl. 24, fig. 7, *P. acuta*). Distribution, Jamaica.

Pleurodonte is allied to *Caprinus* in characters of dentition and genitalia, the anatomical features of the two groups being practically alike. The shell differs from that of *Caprinus* somewhat in the arrangement of the teeth, which in *Pleurodonte* are restricted to the basal lip; but chiefly by the general *facies*—something difficult to define, but readily recognized in the shells themselves. The group is developed with a wonderful exuberance and variety of specific and subspecific forms, perhaps unparalleled in any tract of like extent in the world. The anatomy has been investigated by Semper (Reisen), Binney (Ann. N. Y. Acad.), and myself.

This group has hitherto been called *Pleurodonta* or *Lucerna*; but Fischer's Latin form of the word, as well as his French version, was "*Pleurodonte*." His name was accompanied by a sufficient diagnosis. He included several species of the Jamaica group, and also *H. lychnuchus*, *lupicida* and *isognomostomus* (= *personata*); but as these three have been made the types of subsequent groups, we obtain by elimination a residue of several congruous species, of which the first one of his list has been selected as the type. *Dentellaria* Schumacher was proposed for two species, the first one of which was undescribed and unfigured, but compared with an old illustration probably representing a small form of *H. acuta*; the second being *H. sinuata* Müll. *Lucerna*, proposed anonymously by Humphrey in the sale catalogue of M. de Callonne's collection, was not defined, and contains none of the Jamaica group, so far as one may judge by the fantastic list of species given under impromptu names of the auctioneer's manufacture. He seems to have included *Labyrinthus*, *Anostoma* and *Phania* among other shells; but the work is not worthy of quotation in scientific literature, and its introduction therein by the Adams brothers has caused nothing but confusion.

Species.

- | | |
|---|--|
| <i>P. carmelita</i> Fér., v, 99. | <i>v. nobilis</i> C. B. Ad., v, 103. |
| <i>mora</i> Gray. | <i>P. abnormis</i> Pfr., v, 104. |
| <i>redfieldiana</i> C. B. Ad. | <i>P. chemnitziana</i> Pfr., v, 104. |
| <i>P. bainbridgei</i> Pfr., v, 99. | <i>fluctuata</i> C. B. Ad. |
| <i>lamareckii v. unidentata</i> Fér. | <i>P. lucerna</i> Müll., v, 105. |
| <i>v. pretiosa</i> C. B. Ad., v, 100. | <i>v. julia</i> Fér., v, 105. |
| <i>v. splengleriana</i> Pfr., v, 100. | <i>v. fuscolabris</i> C. B. Ad., v, 106. |
| <i>P. subacuta</i> Pfr., v, 100. | <i>P. rhynchæna</i> A. D. Br., v, 106. |
| <i>P. acuta</i> Lam., v, 100. | <i>P. peracutissima</i> C. B. Ad., v, 106. |
| <i>v. acuta</i> Lam., v, 100. | <i>straminea</i> Alb. |
| <i>acutissima</i> Lam. | <i>martiniana</i> Pfr. |
| <i>heteroclites</i> Lam. | <i>P. cara</i> C. B. Ad., v, 107. |
| <i>v. lamareckii</i> Fér., v, 102. | <i>amabilis</i> C. B. Ad. |
| <i>v. sublucerna</i> Pils., v, 102. | <i>v. media</i> Ad., v, 107. |
| <i>v. patina</i> C. B. Ad., v, 102. | <i>P. soror</i> Fér., v, 107. |
| <i>f. goniasmos</i> A. D. Br., v, 102. | <i>quadridentata</i> Mke. |
| <i>f. nannodonta</i> A. D. Br., v, 103. | <i>P. schreteriana</i> Pfr., v, 108. |
| <i>v. oxytenes</i> A. D. Brown, v, 103. | <i>v. chittiana</i> C. B. Ad., v, 108. |
| <i>v. ingens</i> C. B. Ad., v, 103. | |

- P. tridentina* Fér., v, 109. *P. valida* C. B. Ad., v, 113.
swainsoniana C. B. Ad., v, 109. *P. picturata* C. B. Ad., v, 113.
v. *browneana* Pfr., v, 109. *sinuata* Deless., Chenu, etc.
v. *subsloaneana* Pils., v, 110. *P. pallescens* Shuttl., v, 114.
P. okeniana Pfr., v, 110. *P. sinuata* Müll., v, 114.
fortis C. B. Ad., Rv. v. *propenuda* Ad., v, 115.
P. atavus Shuttl., v, 110. *P. sinuosa* Fér., v, 115.
P. sloaneana Shuttl., v, 111. *consanguinea* C. B. Ad.
bronni v. β Pfr. v. *simson* Pfr., v, 116.
schröteriana Rv. *P. invalida* C. B. Ad., v, 117.
v. *vendryesi* Ckll., viii, 263. v. *candescens* C. B. Ad., v, 117.
P. bronni Pfr., v, 112. *P. anomala* Pfr., v, 117.
P. strangulata C. B. Ad., v, 112.

Section *Caprinus* Montfort, 1810.

Caprinus MONTF., Conch. Syst., ii, p. 142, type *Caprinus recognitus* Montf. (= *H. lychnuchus* Müll.).—*Lucidula* SWAINS., Treatise on Malacol., p. 329, type *barbadensis* (= *isabella* Fér.).—*Lucernella* SWAINS., t. c., p. 330, type *hippocastaneum* (= *nuxdenticulata*).—*Dentellaria* BECK, Index Molluscorum p. 34, (1837), and of subsequent authors. Not *Dentellaria* Schumacher, Essai, p. 230!

Shell imperforate, *solid, opaque*, globose or depressed, the spire convex or conoidal, periphery rounded or keeled. Surface generally granulated. Aperture transverse, wider than high, oblique, the *peristome thick*, expanded, the *basal lip widened and generally toothed*; parietal wall covered with a callus, sometimes toothed. Type see also (*P. lychnuchus* *P. isabella* Fér., pl. 25, fig. 11; pl. 25, fig. 10, *P. nuxdenticulata*).

Animal (of *P. orbiculata*) having the sole undivided; edges of foot with no trace of a foot-margin. Entire upper surface rather evenly granulated, the granules arranged in rather indistinct longitudinal rows on the back, elsewhere irregularly placed. Mantle margin without shell-lappets, the right body-lappet well developed, the left minute, subobsolete.

Jaw arcuate, solid, and either having few strong ribs (*pachygastra*, *orbiculata*, *isabella*, *dentiens*, *nucleola*, *badia*, *nuxdenticulata*), or without ribs, but having a median projection (*formosa*, *josephine*). *P. orbiculata*, *perplexa* and *lychnuchus* have weak ribs or traces of ribs, thus connecting the two extremes of jaw structure (pl. 24, fig. 2, *P. josephine*; fig. 3, *nuxdenticulata*; fig. 9, *orbiculata*; fig. 11, *dentiens*).

Dentition characterized by the absence of side cusps on central and lateral teeth, a lateral continuation of the reflexed cutting edge of the mesocones representing the absent side cutting points. Marginal teeth having a large, bifid mesocone and a small simple or bifid ectocone (pl. 24, fig. 8, *P. orbiculata*; pl. 24, fig. 12. *P. dentiens*).

Genitalia without accessory organs on the female side, the duct of the spermatheca long. Penis having the retractor muscle inserted at its apex, and continued above in a long epiphallus terminating in a flagellum (pl. 24, fig. 10, *P. orbiculata*).

Distribution, Lesser Antilles.

In this group the shell is solid and opaque, as in *Caraculus* s. str., but the basal lip is widened and more or less distinctly toothed. It is closely allied to the *Pleurodonte* series, of Jamaica; and while it is easy to distinguish the two groups on sight, it is extremely difficult to point out the differences in words. Anatomically *Caprinus* and *Pleurodonte* are similar.

It is much to be regretted that the well-known name for this section had to be rejected; but it is better to correct the mistakes of early systematists than to perpetuate them.

- | | |
|---|--|
| <i>P. nuxdenticulata</i> Chemn., v, 82. | <i>v. guadeloupensis</i> Pils., v, 87. |
| <i>punctata</i> Born not Müll. | <i>P. lychnuchus</i> Müll., v, 87. |
| <i>hippocastaneum</i> Lam. | <i>recognitus</i> Montf. |
| <i>P. nucleola</i> Rang, v, 82. | <i>P. josephinae</i> Fér., v, 88. |
| <i>crassidens</i> Pfr. | <i>scabrella</i> Mke. |
| <i>P. parilis</i> Fér., v, 83. | <i>v. nevisensis</i> Pils., v, 89. |
| <i>pseudoparilis</i> Grat. | <i>P. perplexa</i> Fér., v, 89. |
| <i>P. obesa</i> Beck, v, 83. | <i>granifera</i> Gray. |
| <i>P. dentiens</i> Fér., v, 84. | <i>P. formosa</i> Fér., v, 90. |
| <i>v. isabellina</i> Pils., v, 85. | <i>lenocinia</i> Fér. |
| <i>P. isabella</i> Fér., v, 85. | <i>P. pachygastra</i> Gray, v, 90. |
| <i>barbadensis</i> Lam. | <i>fuscoviridis</i> Grat. |
| <i>guldingi</i> Pfr. | <i>dolata</i> Fér. |
| <i>P. orbiculata</i> Fér., v, 86. | <i>P. nigrescens</i> Wood, v, 91. |
| <i>P. badia</i> Fér., v, 86. | <i>fuliginea</i> Fér. |

Section *Gonostomopsis* Pilsbry, 1889.

Gonostomopsis PILS., Man. Conch. v, p. 92.—*Chrysodon* ANC., Conchol. Exch. i, p. 54, 1887, not *Chrysodon* Oken, 1815.

Shell narrowly umbilicated, rather thin, opaque, *hirsute*, the *spire depressed*, body-whorl depressed, rounded at periphery. Aperture as high as wide, *trilobate-lunar*; peristome narrowly expanded, the outer and basal margins each with one tooth. Type *P. auridens* Rang., pl. 25, figs. 12, 13.

Anatomy unknown. The single species inhabits Martinique. It resembles in form *H. obvoluta* Müll. of Europe.

Section *Caracolus* Montf.

Caracolus MONTF., Conch. Syst. ii, p. 138.—PILSBRY, Man. of Conch. v, p. 113.—*Caracolla* SCHUM., Essai, p. 192, 1817.—*Serpentulus* (KLEIN, Tent. Meth. Ostr., p. 8, 1753; in part) H. & A. AD., Gen. Rec. Moll. ii, p. 201.—*Lampadion* BOLT. in part.—*Discodoma* SWAINS., Malacol., p. 329, 1840.

Shell depressed, *carinated*, imperforate or umbilicate; thick, *solid and opaque*; *spire conical*, apex obtuse. Whorls 5-6, the last but little or not deflexed in front. Aperture oblique, wider than high; *peristome not toothed*, its basal margin expanded or narrowly reflexed, terminations remote. Type *P. caracolla* L., pl. 25, fig. 1.

Jaw arcuate, stout, and either smooth with a low median projection (*P. caracolla*, *P. marginella*, *P. semiaperta*), or furnished with stout ribs (*P. bornii*). See pl. 26, fig. 3, *P. marginella*; pl. 26, fig. 6, *P. marginella* var. *rostrata*.

Radula having the central and lateral teeth furnished with a single broad obtuse cusp (coalescent meso- and ectocone). Marginal teeth having an oblique cusp, which is simple as in the lateral teeth, or split into mesocone and ectocone (pl. 26, fig. 8, *P. caracolla*; fig. 1, *P. marginella*; fig. 2, *P. marginella* var. *semiaperta*).

Genital organs having the vagina more or less swollen, spermatheca oval, on a rather long (*P. caracolla*) or a short duct (*P. marginella*). Penis long, the retractor inserted at its summit; continued in a long epiphallus which terminates in a short flagellum (pl. 26, fig. 7, *P. caracolla*, penis everted; pl. 26, figs. 4, 5, *P. marginella* var. *rostrata* viewed from both sides, the extremely short flagellum seen in fig. 4).

Distribution: Eastern Cuba (*P. marginella* and varieties), Hayti (*P. caracolla*, *excellens*, *insititia*, *sarcocheila*, *angistoma*, *bizonalis* and *semiaperta*), and Porto Rico and Viéque (*P. bornii*).

The strong, opaque, carinated shell, with toothless aperture, uni-colored or with few, broad bands, is characteristic, as is also the very long epiphallus and short flagellum, and the blunt, broad cusps of the teeth. The jaw is either smooth or ribbed, as in *Caprinus*. A fuller knowledge of the genitalia is necessary for the final settlement of specific limits; meantime the following arrangement is offered.

<i>P. caracolla</i> Linn., v, 120.	<i>sagemon</i> Beck.
<i>tornata</i> Born.	<i>arangiana</i> Poey.
<i>albilabris</i> Lam.	<i>marginatoides</i> d'Orb.
<i>oculatus</i> Montf.	? <i>fasciata</i> Blv.
<i>P. excellens</i> Pfr., v, 120.	? <i>indiscreta</i> Beck.
<i>P. insititia</i> Shutt., v, 121.	v. <i>gutierrezii</i> Poey, v, 125.
<i>P. sarcocheila</i> Mörch, v, 121.	v. <i>schwartziana</i> Pfr., v, 125.
<i>P. angistoma</i> Fér.	v. <i>mina</i> Pfr., v, 125.
<i>angystoma</i> Dh.	<i>marginata</i> Orb.
<i>anchistoma</i> v. Mart.	<i>jactata</i> Gundl.
<i>P. bornii</i> Pfr., v, 127.	v. <i>rostrata</i> Pfr., v, 126.
<i>marginella</i> Pfr not Gmel.	<i>pazensis</i> Poey.
<i>P. bizonalis</i> Desh., v, 127.	<i>cupulata</i> Pfr.
v. <i>gaskoini</i> Pfr. v, 127.	v. <i>marginelloides</i> d'Orb., v, 126.
<i>P. marginella</i> Gmel., v, 124.	<i>transitoria</i> Pfr.
<i>marginata</i> Born.	v. <i>semiapertura</i> v. Mart., v, 125.

Section *Isomeria* Albers, 1850.

Isomeria ALB., Die Hel., p. 126, type *H. oreas* Koch.—v. MART., Die Hel., p. 155.—PILSBRY, Manual of Conch. v, p. 135.

Shell depressed, *solid, opaque, chestnut or chocolate colored*, rounded or obtusely carinated at the periphery, imperforate or umbilicated. Spire depressed, convex, with 6 or fewer whorls, the last deflexed or straight in front. Aperture wider than high, very oblique; peristome expanded or reflexed, toothless or with small teeth, of which one is situated near the termination of the periphery; ends of peristome remote, joined by a parietal callus, the parietal wall often having an oblique tooth. Type *P. oreas* Koch. (pl. 25, figs. 2, 3, *P. faunus* var. *ritchiana*).

Animal unknown.

A group of large and beautiful dark colored helices confined to the valleys of the higher Andes of Ecuador and Columbia, where

they replace *Labyrinthus* of the lower regions of northern South America. The shells differ from *Labyrinthus* in the more or less transversely dilated contour, the swollen base of the latter portion of the body-whorl, and the less developed aperture-teeth. In a few species (*enigma*, *vexans*) the teeth are strongly developed; but these are to be regarded as an independent line of evolution from typical *Isomeria*, rather than as an intermediate or ancestral form between *Isomeria* and *Labyrinthus*.

Species.

- | | |
|---|---|
| <i>P. oreas</i> Koch, v, 136. | <i>P. granulatissima</i> Mill., v, 148. |
| <i>procera</i> Pfr. | <i>P. gealei</i> E. A. Sm., v, 149. |
| <i>P. faunus</i> Phil., v, 137. | <i>P. stoltzmanni</i> Lub., v, 150. |
| <i>v. ritchieana</i> Pils., v, 138. | <i>P. æquatoria</i> Pfr., v, 150. |
| <i>P. subelliptica</i> Mouss., v, 139. | <i>P. equestrata</i> Moric., v, 151. |
| <i>P. continua</i> Pfr., v, 137. | <i>P. triodonta</i> d'Orb., v, 152. |
| <i>P. aloagana</i> Jouss., v, 139. | <i>P. juno</i> Pfr., v, 152. |
| <i>P. peritropis</i> Pils., v, 140. | <i>P. neogranadensis</i> Pfr., v, 153. |
| <i>P. fordiana</i> Pils., v, 141. | <i>P. hartwegi</i> Pfr., v, 153. |
| <i>P. calomorpha</i> Jonas, v, 142. | <i>lorensis</i> Mill. |
| <i>P. æquatoriana</i> Hid., v, 142. | <i>P. basidens</i> Mouss., v, 154. |
| <i>P. scalena</i> v. Mart., v, 143. | <i>P. bituberculata</i> Pfr., v, 154. |
| <i>P. meobambensis</i> Pfr., v, 144. | <i>bourcierii</i> Rv. not Pfr. |
| <i>P. atrata</i> Pfr., v, 144. | <i>v. tridentula</i> Mill., v, 155. |
| <i>P. mauritii</i> Jouss., v, 145. | <i>v. latidentata</i> Mill., v, 156. |
| <i>atrata</i> Rv. not Pfr. | <i>P. bourcierii</i> Pfr., v, 156. |
| <i>P. cymatodes</i> Pfr., v, 146. | <i>bituberculata</i> Rv. not Pfr. |
| <i>P. parietidentata</i> Mill., v, 147. | <i>P. subcastanea</i> Pfr., v, 157. |
| <i>P. kohlbergi</i> Mill., v, 148. | <i>globosa</i> Brod. not Sowb. |
| <i>P. martinii</i> Bern., v, 149. | <i>P. ænigma</i> Dohrn, v, 158. |
| <i>morula</i> Hid. | <i>P. vexans</i> Dohrn, v, 158. |

Section *Labyrinthus* Beck, 1837.

Labyrinthus BECK, Index Moll., p. 33, type *L. otis*=*labyrinthus* Dh.—PILSBRY, Manual of Conch. (2), v, p. 159.—MARTENS, Biol. Centr. Amer., Land Moll., p. 175.—*Lyrostoma* SWAINS., Malacol. p. 329, type *L. labyrinthus*.—*Lyriostoma* SWAINS., l. c., footnote (1840).

Shell umbilicate, depressed, carinated, microscopically granulated, not transversely dilated. Whorls less than 6, the last descending in

front, constricted behind the peristome. Aperture transverse, sub-horizontal, *obstructed by three primary folds or teeth,—one long parietal fold, one tooth on the outer, another on the inner portion of the basal lip*; peristome expanded or reflexed in every part, *continuous across the parietal wall*. Type *P. labyrinthus*, pl. 25, figs. 4, 5. (See also pl. 22, figs. 7, 8, *P. sieversi*).

Soft parts unknown. Jaw slightly striated (Mörch, Journ. de Conch. 1865, p. 381), with a slight median projection. Teeth all uni-cuspid (Semper, Reisen, p. 105) as in the Cuban *Caracolus*. (Pl. 26, fig. 9, *P. plicata* Born, after Semper).

This group is characteristic of northern South America, extending from the Amazon River and its western tributaries in eastern Peru, northward in Central America to Costa Rica. It inhabits less elevated regions than the allied group *Isomeria*. Its complicated aperture-armature has doubtless been evolved for protection against predaceous insects (*cf.* Man. of Conch. v, p. 159; Biol. Centr. Amer. Moll., p. 175; Pop. Sc. Monthly, 1892, p. 191).

Labyrinthus agrees with the restricted section *Caracolus* in teeth and jaw, as well as in the general features of the shell. It stands in about the same relation to *Caracolus* that *Triodopsis* and the auriculate *Polygyras* hold toward the toothless *Mesodons*. There seems no sufficient reason for considering *Labyrinthus* a distinct genus, as von Martens has done.

Species.

- | | |
|---|--|
| <i>P. labyrinthus</i> (Chem.) Dh. v, | <i>P. leucodon</i> Pfr., v, 167. |
| <i>subplanata</i> Petit. [161. | <i>P. sieversi</i> v. Mart., viii, 263. |
| <i>v. erecta</i> Mouss., v, 162. | <i>P. quadridentata</i> Brod., v, 168. |
| <i>v. sipunculata</i> Forbes, v, 162. | <i>P. tamsiana</i> Dkr., v, 169. |
| <i>annulifera</i> Pfr. | <i>P. tarapotonensis</i> Moric., v, 170. |
| <i>P. plicata</i> Born, v, 163. | <i>P. bifurcata</i> Desh., v, 170. |
| <i>hydiana</i> Lea. | <i>P. furcillata</i> Hupé, v, 171. |
| <i>hydeanus</i> v. Mart. | <i>P. raimondii</i> Phil., v, 172. |
| <i>P. uncigera</i> Petit, v, 164. | <i>P. yatesi</i> Pfr., v, 173. |
| <i>conoidea</i> Anc., viii, 264. | <i>P. ellipsostoma</i> Pfr., v, 173. |
| <i>anopla</i> Anc., viii, 264. | <i>P. lepieurii</i> Petit, v, 174. |
| <i>v. creveauxiana</i> Anc., viii, 264. | <i>auriculina</i> Petit. |
| <i>P. triplicata</i> v. Mart., v, 165. | <i>P. dunkeri</i> Pfr., v, 174. |
| <i>æsupus</i> Ang. | <i>P. isodon</i> Pfr., v, 175. |

P. manuei Higg., v, 166.

manoeli Pfr.

manseli Pfr.-Cless.

P. bogotensis Pfr., v, 176.

P. otostoma Pfr., v, 176.

stostoma Rv.

Section *Thelidomus* Swainson, 1840.

Thelidomus SWAINS., Malacology, p. 191, 192, 330, type *H. incerta* Fér. Not *Thelidomus* Swains., t. c., p. 228, 353, = larva-cases of *Helicopsyche*, (Neuroptera).—*Otala* BECK and others, not of Schumacher. —*Pachystoma* ALBERS, Die Hel., 1850, p. 125. Not *Pachystoma* Guilding, Zool. Journ. 1828, p. 536.—? *Thelidonta* SWAINS., t. c., p. 194.

Shell imperforate, globose-depressed, with few whorls, the last deflexed in front, swollen beneath, carinated or rounded at the periphery. Surface granulated, costulate-striate or decussated. Aperture very oblique; peristome expanded, thickened within, the lower margin straightened, with a plate-like callus inside. Type *P. incerta* Fér. (See pl. 22, fig. 5, *P. lima*; pl. 22, fig. 4, *P. trinitaria*).

Jaw arcuate, having 7–15 strong ribs, sometimes not denticulating the lower margin (pl. 23, fig. 23, *P. auricoma* var. *havanensis*).

Radula either with or without ectocones on central and inner lateral teeth. Marginal teeth obtusely and obscurely bicuspid. Pl. 23, fig. 22, *P. auricoma* var. *havanensis*.

Animal having the sole undivided; lateral edges without trace of pedal grooves or margins. Sides of foot granulated, granules arranged in vertical series in the middle, obliquely descending series in front and behind; back irregularly granular, without longitudinal grooves.

Genital system having the penis stout, with a flagellum at apex; vas deferens and retractor muscle also inserted at apex, the latter slender, and attached distally to the integument of the vestibule; a small appendix sometimes present; no internal papilla, the opening of the vas deferens being a simple orifice at the base of the flagellum (pl. 23, fig. 19, showing opened penis and vestibule). Spermatheca oval or oblong, enveloped in the folds of the uterus, its duct short, bearing at the base a broad muscle connecting with the integument of the body-wall near the genital orifice (pl. 23, fig. 21, v. m.); ovotestis composed of one compact tuft of long creca, (pl. 23, figs. 19–21, *P. auricoma* var. *havanensis*; pl. 23, fig. 24, *P. lima*; pl. 23, fig. 25, *P. aspera*).

The principal peculiarity of the shell of *Thelidomus* is the plate-like baso-columellar lip, somewhat like that of *Acarus* or *Macularia*. The anatomy exhibits considerable variation in some details, such as the presence (pl. 23, fig. 24, *lima*) or absence (pl. 23, figs. 20-21, *auricoma* v. *havanensis*) of an appendix. The spermatheca duct is much shorter than in *Parthena*. Many more species must be investigated before a satisfactory account can be given of the peculiarities of the genitalia of *Thelidomus* and related groups. See Poey, *Memorias*; W. G. Binney, *Proc. Acad. Nat. Sci. Phila.* 1875, and *Ann. N. Y. Acad.*; Semper, *Reisen*, pl. 15. The eggs are oval, white and calcareous-shelled; the embryonic shell is densely granulated in the typical forms, shining and radially grooved in the Cuban group which I have called *Zachrysia*. The latter are said to form a calcareous epiphragm.

(*Thelidomus* s. str., species of Jamaica, Porto Rico and Lesser Antilles).

<i>P. incerta</i> Fér., v, 57.	<i>punctifera</i> Im.
<i>notabilis</i> Fér.	<i>asperula</i> Beck.
<i>curvidens</i> Pfr.	v. <i>castrensis</i> Pfr., v, 59.
<i>striolata</i> Guild.	<i>P. aspera</i> Fér., v, 59.
<i>alutacea</i> Zgl.	<i>grauosa</i> Wood.
<i>velutinoïdes</i> Anton.	<i>P. cognata</i> Fér., v, 59.
<i>ravuii</i> Beck.	<i>P. discolor</i> Fér., v, 60.
<i>P. lima</i> Fér., v, 58.	<i>P. ? sanctæ lucie</i> Smith, v, 198.

(*Zachrysia*; species of Cuba and Bahamas).

<i>P. petitiæ</i> Orb., v, 60.	<i>P. emarginata</i> Gundl., v, 64.
<i>P. guanensis</i> Poey, v, 61.	<i>P. bayamensis</i> Pfr., v, 64.
<i>P. scabrosa</i> Poey, v, 61.	<i>P. guantanamoensis</i> Poey, v, 65.
<i>P. auricoma</i> Fér., v, 62.	v. <i>proboscidea</i> Pfr., v, 66.
<i>microstoma</i> Im.	<i>P. rangelina</i> Pfr., v, 66.
v. <i>noscibilis</i> Fér., v, 63.	<i>P. trinitaria</i> Gundl., v, 67.
v. <i>havanensis</i> Pils.	<i>P. baracoensis</i> (Gut.) Poey, v,
"zeta" Pfr., v, 63.	<i>lamellicosta</i> Pfr. [67.
v. <i>provisoria</i> Pfr., v, 63.	

Section *Polydontes* Montfort.

Polydontes MONTF., *Conch. Syst.* ii, p. 154, type *P. imperator*.

Shell large, depressed, imperforate or narrowly umbilicated, *solid and heavy*; the surface microscopically decussated. Whorls $4\frac{1}{2}$ -5,

the last often carinated, slightly deflexed in front. Aperture oblique, *the peristome thick*, expanded, simple or bearing obtuse teeth, and *having an obtuse fold near the columellar insertion*. Type *P. imperator*, pl. 22, fig. 9.

Anatomy unknown. Eggs large, oblong, with a hard calcareous shell, that of *P. imperator* (pl. 22, fig. 10) measuring $8\frac{1}{2}$ by 12 mill. Young having when hatched a granulated, umbilicated shell of about $2\frac{1}{2}$ whorls, measuring about one-fifth the diameter of the adult shell.

The shell in this section is generally marked with many spiral lines of brown, the widest and most conspicuous being immediately below the periphery. *P. apollo* is sometimes unicolored. It will be seen that in coloration, the relationship of *Polydotes* to *Parthena* (*P. dominicensis*, etc.) is extremely close. All three species of *Polydotes* are known to voluntarily amputate their tails when captured (Journ. de Conchyl. 1860, p. 226). They live under dead leaves. Distribution, eastern Cuba.

P. imperator Montf., v, 79.

P. sobrina Fér., v. 80.

magica Fér.

crassilabris Pfr.

P. apollo Pfr., v, 79.

Section *Parthena* Albers.

Parthena ALB., Die Hel., p. 112 (first species *H. angulata*).

Shell imperforate, globose or depressed, the periphery rounded or carinated; spire short, whorls 4– $4\frac{1}{2}$, the earlier $1\frac{3}{4}$ forming a granulated or radially grooved embryonic shell, the last notably inflated and capacious, unicolored or begirt with many brown lines; surface granulated. Aperture large; peristome expanded; columella arcuate. Type *P. angulata*, pl. 22, fig. 2. (See also pl. 22, fig. 3, *P. dominicensis*).

Animal (of *P. dilatata*) having the sole undivided, with no indication of lateral borders or pedal grooves. Upper surface and sides coarsely granulated, the granules arranged in descending rows on the sides, finer and irregular on the back; tail rounded above; back from mantle to face irregularly granulated, lacking longitudinal grooves. Mantle-edge lacking shell-lappets; body-lappets well developed, the right one short, the left extending the entire length of the outer lip of the shell (pl. 23, fig. 15, showing posterior angle of aperture, respiratory opening and lappets).

Jaw strong, arcuate, sculptured with high, rather narrow ribs crenulating the upper margin only, or both margins (pl. 23, fig. 16, *P. dilatata*). In *P. angulata* Binney found 7 ribs on the jaw; in *crispata* 10 ribs. In *P. dilatata* we find 9–11 ribs, which crenulate the upper but not the lower margin, the latter having a slight median projection.

Dentition: Central and lateral teeth having stout, long mesocones projecting beyond the basal-plates; ectocones represented by a lateral bulging of the reflection of the cusp, or by distinctly developed cutting-points. Marginal teeth having the mesocones stout, oblique, blunt or sub-bifid, the ectocone simple, minute (pl. 23, fig. 18, *P. angulata*; pl. 23, fig. 17, *P. dilatata*).

Genitalia: Female system presenting no accessory organs; the spermatheca short, globular, situated upon a long duct. Penis stout, cylindrical, having a large globular appendix near its base. At its apex is situated a short, curved, obtuse flagellum, near the base of which is inserted the vas deferens, and a short teat-like organ which is solid and fleshy, not perforated or hollow. No retractor muscle seen. When opened lengthwise the walls of the cavity of the appendix and of the penis are seen to be longitudinally folded (fig. 14), the folds disappearing in the upper part of the penis-cavity. The upper part of the cavity is occupied by a large, free, pestle-shaped penis-papilla, perforated at the end, the perforation leading to the cavity of the vas deferens and flagellum the latter being corrugated inside (pl. 23, fig. 13, 14, *P. dilatata*).

Distribution: Hayti.

P. angulata Fér., v, 69.

inflata Dh.

acutangula Beck.

P. oblitterata Fér., v, 69.

P. angustata Fér., v, 70.

P. dominicensis Pfr., v, 70.

extensa Pfr. not Müll.

P. dissita Dh., v, 71.

P. undulata Fér., v, 72.

lineolata Lam.

v. crispata Fér., v, 72.

P. dilatata Pfr., v, 73.

Section *Luquillia* Crosse, 1892.

Luquillia CROSSE, Journ. de Conchyl. 1892, p. 19, type *H. luquillensis*.—*Leiostoma* SWAINS. Malacol., p. 328 (preoc.), 1840.

Shell imperforate, solid, subglobose with rather conoidal spire, of about $5\frac{1}{2}$ whorls, the earliest $2\frac{1}{2}$ forming the *large, coarsely gran-*



ulated embryonal shell, the following whorls *microscopically decussated*; the last whorl rounded at periphery. Color yellowish-brown with dark oblique streaks and sometimes a subperipheral girdle. Aperture wider than high, the thick lip expanded; columella short, arcuate, with an obscure callus fold. Type *P. luquillensis* Shutt. (See pl. 22, fig. 1, *P. gigantea*).

Soft anatomy and jaw unknown. Radula (of *P. luquillensis*) as in *Parthena angulata*, q. v.

Distribution, Haiti and Porto Rico.

P. gigantea Scop., v, 73.

P. audebardi Pfr., v, 74.

cornumilitare auct. not L.

P. luquillensis Shutt., v, 74.

Section *Euryeratera* (Beck) Gray.

Euryeratera BECK, Index Moll., p. 45, in part.—GRAY, P. Z. S. 1847, p. 171, type *H. jamaicensis*.—*Lejocheila* or *Leiocheila* ALBERS, Die Hel., p. 109, 1850.—*Liochila* v. MART., Die Hel., p. 146, 1860, type *H. jamaicensis*.

Shell imperforate, *globose*, solid, the surface finely wrinkled, embryonal whorls $1\frac{1}{2}$, large, shining, not granulated. Whorls 4, the last very large, rounded, having few color bands. Aperture very large, oval, the outer lip expanded, columella long, arcuate; parietal and columellar callus spreading upon the base. Type *P. jamaicensis* Gmel., pl. 22, fig. 6.

Jaw thick, arcuate, attenuated toward the ends, the anterior surface sculptured with 14 decided but unequal ribs, irregularly disposed, and denticulating either margin. Lingual membrane with 41.1.41 teeth. Side cusps and cutting points wanting on central and inner lateral teeth, but represented by an expansion of the reflexed sides of the mesocones. The single species is confined to Jamaica.

Beck selected no type for *Euryeratera*, and his list of species includes forms belonging to many diverse groups. Gray, in 1847 selected *H. jamaicensis* as type of the group, and I do not see how we can avoid following his selection; especially in view of the fact that v. Martens, in 1860, selects as type *H. dominicensis*, a species not included by Beck in his list, and therefore certainly not the type of his group.

Genus CAMÆNA (Alb.) Pils. & v. Möll.

Camæna ALBERS, Die Heliceen p. 85, 1850, in part.—*Camæna* Alb., v. MARTENS, Die Hel. 2d. edit., p. 165, type *cicatricosa* Müll. (restricted to sinistral species of *Camæna* and *Euhadra*).—*Camæna* Alb., PILSBRY, Man. of Conch. vi, p. 197, and viii, 265.—v. MOLLENDORFF, Nachrichtsbl. d. D. M. Gesellsch. 1891, p. 195.—PILSBRY, l. c., 1892, p. 71; Proc. Acad. Nat. Sci. Phila., 1892, p. 398 (anatomy).—*Eucochlias* THEOB. in Nevill's Handlist Moll. Ind. Mus. pt. 1, p. 81, 1878 (type, *ochthoplax*; contains also *bougainvillei*, *illustris* *sulcocincta* and *pyrostoma*).

+ *Pseudobba* v. Moell. and *Phœnicobius* Mörch.

Shell rather large, varying from depressed-globose or conoidal to elevated and short pupiform; dextral or sinistral, solid, yellow or brown usually encircled by chestnut bands or lines. *Surface closely malleated or wrinkled all over*; whorls about $5-5\frac{1}{2}$, the upper ones flattened, the last subglobose or carinated; peristome expanded or reflexed, its ends not converging, columellar margin dilated over or partly over the rather narrow umbilicus. The columella is rounded. *The nuclear shell is rather large*, (about one-fifth the diameter of the shell), consisting of 2 to $2\frac{1}{2}$ whorls, its junction with the after-growth marked by a (generally) distinct line. The young shells are acutely carinated. Type *cicatricosa* Müll., pl. 19, fig. 8.

Animal having the sole *very indistinctly* tripartite; *lateral edges of foot with no trace of a foot-margin*, sides of foot granulated in irregular pattern, the tail rather long, rounded above, *with an indistinct slightly impressed longitudinal median line*; anteriorly there are a few indistinct longitudinal grooves from mantle to head. Mantle-margin with a small triangular right body-lappet, and a longer left one.

Jaw arcuate, strong, typically with numerous strong, separated ribs (pl. 18, fig. 5).

Dentition: *Central and lateral teeth having the mesocones only developed*, the cusps large, cutting-points small (pl. 18, fig. 6). Marginal teeth with a long, oblique, bifid mesocone united at base with the ectocone, which becomes bifid on the outer teeth (pl. 18, fig. 7).

Genitalia: Vestibule short; penis stout, *continued above in an epiphallus, in which the retractor and then the vas deferens is inserted, and terminating in flagellum*; penis corrugated within, and having a large papilla at its apex (pl. 18, figs. 2, 4). Vagina stout, bound

to the body-wall by a band of muscles; duct of the spermatheca long (pl. 18, figs. 1 and 3).

Distribution of the typical forms, southern China (provinces Kwang-Tung and Kui-chu) to Burmah and southward.

The most important features of this genus are found in the genital system, which is of the type called by the writer *epiphallophorous*. The penis is continued upward in a flagellum-like extension (epiphallus), in which the vas deferens enters, and which enters the penis itself through a penis-papilla (pl. 18, fig. 2). Thus far, the structure is exactly like *Caracolus* of the West Indies; but *Camæna* differs from *Caracolus* in having the retractor muscle inserted upon the epiphallus instead at the apex of the true penis. The penis-retractor is attached to the floor of the lung-sack. The female system lacks all accessory organs, and the duct of the spermatheca is longer than in *Pleurodonte*. The vagina has strong muscular walls, and is bound to the adjacent right body-wall by a band of muscles (shown in pl. 18, fig. 1); this structure occurs also in the West Indian *Thelidomus* (see p. 96). The teeth are of the *Caracolus* type, being characterized by the total absence of side cusps on centrals and inner laterals. The specimens dissected were received from Dr. v. Möllendorff, without the shell. I take them to be *C. xanthoderma*.

The shell is rather large, capacious, solid, and generally roughly sculptured. The Japanese sinistral helices (*H. quærita*, etc.) have been associated with *Camæna*, but they belong to a totally different phylum of *Helix*. The columellar lip is rounded in *Camæna*, not expanded in a flat plate as in *Phania* or *Aearus*.

Perhaps no group of *Helices* has been less understood by systematists than this. Albers included several very diverse types in his original list of species. Martens restricted the group to large, capacious sinistral helices of true *Camæna* and the very different group *Euhadra*. Pfeiffer united the whole Oriental and Australian series of *Euhadra*, *Camæna* and *Hadra* under the one name *Camæna*. The present writer, in 1890, defined the natural groups of Oriental *Helices*, and indicated the conchological characters upon which they rest, restricting *Camæna* to forms having a large nuclear shell. This work was criticised by v. Moellendorff (Nachrbl. D. M. G. 1891, p. 195), and several improvements in classification were suggested. These were in large part adopted in a later paper by the writer (Nachrbl. 1892, p. 71).

Subdivisions.

Subgenus CAMÆNA (restricted). Shell capacious, narrowly umbilicated, depressed-globose, often carinated. *Surface malleated or wrinkled. Last whorl not descending in front.* Distribution southern China and Farther India.

Section *Phœnicobius* Mörch. Shell differing from Camæna in the generally more elevated, conoidal or pupiform shape, and in having (typically) four dark spiral bands; the surface varying from smooth to rib-striate, sometimes slightly malleated beneath. Distribution, Philippine Is.

Subgenus PSEUDOBBA v. Moell. Shell rudely sculptured, with wrinkles or furrows oblique to the growth-lines; solid; umbilicus large; peristome thickened, the terminations joined by a cord of callus across the parietal wall. Distribution, Northern Celebes and Sangir Is.

Subgenus CAMÆNELLA Pils. Shell *smoothish*, depressed sub-globose, banded and maculated with brown on a white ground; *surface smoothish*; whorls about $5\frac{1}{2}$, the last deflexed in front; embryonal shell less than one-sixth the diameter of the adult. *Columella with an obtuse tooth.* Distribution, Island of Hainan.

Subgenus NEOCEPOLIS Pils. Shell *smoothish*, globose-conical, with 6-7 *closely revolving whorls*, the last deflexed in front. Aperture having an internal fold within, marked by a pit outside; *the columellar lip obtusely toothed.* Distribution, Tonquin.

Subgenus CAMÆNA Alb.

The shell is more wrinkled or malleated than in *Phœnicobius*; the last whorl does not descend in front. Of the four principal color bands of this phylum of Helices, band ii (supraperipheral), or band iii (subperipheral) is retained, bands i and iv being absent. Some species show many fine spiral lines of color in addition. The anatomy is described above. The jaw is ribbed. The subgenus is Indo-Chinese in distribution. Many more species will probably be discovered. Type *C. cicatricosa*, pl. 19, fig. 8.

Species.

- | | |
|---------------------------------------|------------------------------------|
| <i>C. cicatricosa</i> Müll., vi, 198. | <i>v. inflata</i> Mlldff, vi, 199. |
| <i>senegalensis</i> Fér. | <i>v. ducalis</i> Anc., vi, 199. |
| <i>chinensis</i> Voigt. | |

- | | |
|--|--|
| <i>C. longsonensis</i> Morl., viii, 265. | <i>C. gabriellæ</i> Dautz. & d'Ham., |
| <i>C. jaculata</i> Mab., vi, 120. | <i>bathmophora</i> Mab. [vi, 205. |
| <i>C. seraphinica</i> Heude, vi, 199. | v. <i>subhainanensis</i> Pils., vi, 205. |
| <i>C. hahni</i> Mab., vi, 200. | <i>C. hainanensis</i> H. Ad., vi, 204. |
| <i>broti</i> d'Ham. & Dautz. | <i>C. xanthoderma</i> Mlldff., vi, 206. |
| <i>C. subgibbera</i> Mlldff., vi, 200. | v. <i>polyzona</i> Mlldff., vi, 207. |
| <i>C. leonhardti</i> Mlldff., vi, 201. | <i>C. illustris</i> Pfr., vi, 201. |
| <i>C. vulpis</i> Gredl., vi, 116. | <i>C. ochthoplax</i> Bens., vi, 202. |
| <i>C. pachychila</i> E. A. Sm., viii, 265. | <i>C. saturnia</i> Gld., vi, 203. |

Section PHÆNICOBIVS Mörch, 1852.

Phænicobius MORCH, Cat. Yoldi, p. 32, type *H. arata*.—MLLDFF. Nachrbl. D. M. Ges. 1891, p. 202.—PILSBRY, Man. of Conch. viii, p. 266.

The shell is like *Camæna* in the large embryonal portion, consisting of about $2\frac{1}{2}$ whorls. It differs from *Camæna* in being generally more elevated, sometimes pupiform; and most species have all of the four bands (i subsutural, ii supraperipheral, iii subperipheral and iv umbilical) developed. Type *C. arata* Sowb., pl. 19, fig. 13; (See also pl. 19, fig. 12, *C. monochroa*).

The anatomy is unknown. The species are said to inhabit the Philippine islands Tablas, Mindoro, Luban, Busuanga and Palawan; but the localities of some of the pupiform species are not certain. This group has generally been considered a section of *Cochlostyla*. Dr. v. Möllendorff first pointed out the true affinities of the forms.

Species.

- | | |
|--|-------------------------------------|
| <i>C. arata</i> Sowb., viii, 267. | <i>C. ceres</i> Pfr., vi, 239. |
| v. <i>lutea</i> Pils., viii, 267. | <i>C. traili</i> Pfr., vi, 207. |
| <i>C. brachyodon</i> Sowb., viii, 267. | <i>C. monochroa</i> Sowb., vi, 208. |
| v. <i>naujanica</i> Hid., viii, 268. | <i>palawanica</i> Pfr. |
| <i>C. adusta</i> Sowb., viii, 268. | <i>sauliæ</i> Pfr. |
| <i>C. oblonga</i> Sowb., viii, 269. | <i>lagune</i> Hid. |
| <i>lubanicus</i> Pfr. | <i>doriæ</i> Dohrn. |
| <i>C. oomorpha</i> Sowb., viii, 269. | <i>C. palumba</i> Souv., vi, 209. |
| <i>C. bintuanensis</i> Hid., vi, 237. | <i>C. egregia</i> Dh., vi, 210. |
| <i>C. campanula</i> Pfr., vi, 236. | <i>C. avus</i> Pfr., vi, 210. |
| <i>C. anacardium</i> Dohrn, vi, 238. | |

Subgenus PSEUDOBBA Möllendorff, 1891.

Pseudobba v. MOELL., Nachrbl. D. M. Ges. 1891, p. 202, type *H. mamilla*.—*Obba* (typical part) MARTENS, not Gray.

The shell in this group is heavy, solid, rudely sculptured, with a rather large umbilicus. The subgenus is evidently more nearly allied to *Phœnicobius* than to the continental *Camænas*. Type *C. mamilla*, pl. 19, fig. 9.

The living animal, as figured by Quoy and Gaimard (Voy. de l'Astrol. pl. 7), agrees with that of *Camæna* in external features.

Jaw of *C. quoyi* horse-shoe shaped, the ends attenuated; cutting edge with a distinct median projection (pl. 15, fig. 11). Viewed in profile, the anterior surface is concave (pl. 15, fig. 12). The color is dark chestnut. Anterior surface smooth; showing by transmitted light fine wavy lines parallel with the margins. (*Schako*, from a half-grown specimen; Mal. Bl. xx, p. 169).

Central and lateral teeth with the mesocones only developed, as in *Camæna*. Marginal teeth with a large, oblique, bifid mesocone and an ectocone; also closely resembling the teeth of *Camæna* (pl. 15, fig. 13, central, lateral and marginal teeth, and fig. 14 a lateral of *C. quoyi*, seen in profile).

The species of this subgenus inhabit northern Celebes and the Sangir Is. It is a satellite group of the Philippine Island *Camænas*, which has spread southward like a few *Obbas* and *Cochlostylas*. The dentition is the same as in *Camæna*, but the jaw (of an immature specimen of *quoyi*) lacks ribs; so it seems that in this genus, as in the West Indian *Caracolus*, the presence or absence of ribs is not a generic character. From Quoy's remark that the jaw of *mamilla* is not different from that of French *Helices*, we presume that it is ribbed in that species.

Species.

C. mamilla Fér., vi, 212.

C. linnaeana Pfr., vi, 214.

C. quoyi Desh., vi, 213.

C. tirmaniana Anc., viii, 269.

undulata Q. & G., not Fér.

Subgenus CAMÆNELLA Pilsbry, 1893.

Camænella PILS., Proc. Acad. Nat. Sci. Phila. 1892, p. 398, type *Helix platyodon* Pfr. (Feb. 14, 1893).

Shell depressed, subglobose, solid, imperforate, banded and maculated, with about $5\frac{1}{2}$ whorls, the last descending in front. Surface

minutely granular. Peristome well reflexed, the baso-columellar margin toothed. Embryonal shell smooth, two-whorled, between one-sixth and one-seventh the diameter of the adult, its junction with the after growth indicated by a widening of the whorl. Type *C. platyodon* Pfr., pl. 19, fig. 10.

Animal resembling Camæna. Sole *very indistinctly* tripartite, the edges of foot lacking all appearance of a foot-margin; sides irregularly granulated; tail rounded above, *with a median, impressed longitudinal line*, which does not extend quite to the tail.

Jaw strong, dark orange colored, having eight strong ribs (pl. 39, fig. 3).

Central and lateral teeth of the radula (pl. 39, fig. 1) having a single large cusp, which extends about to the posterior edge of the basal plate. Marginal teeth (pl. 39, fig. 2) becoming quadri-cuspid, by the splitting of both mesocone and ectocone.

Genital system (pl. 39, fig. 4) having a very short vestibule. There is no dart-sack or other accessory gland upon the female side; spermatheca duct very long, without diverticulum. Penis stout, exhibiting, when cut open (fig. 5), a very large penis-papilla; from the apex of the penis arises the slenderer epiphallus, which receives the penis retractor at the middle, the vas deferens at the fourth of its length; beyond the insertion of the vas deferens it is continued in a short flagellum.

In anatomy, *Camænella platyodon* resembles *Camæna* in all respects save that the penis-papilla is larger (a trifling difference) and the cusps of the marginal teeth are much shorter. The shell has a smaller nucleus than in *Camæna*—more as in *Obba*, but not so indistinctly defined; and the maculated white and brown coloration and deflexed last whorl are also as in *Obba*. It differs from *Obba* in lacking an appendix on the penis, and in the ribbed jaw.

C. platyodon Pfr., vi, 239. Island of Hainan.
tournoueri Crosse.

Subgenus NEOCEPOLIS Pilsbry, 1891.

Neocepolis PILS., Man. of Conch. vi, p. 235, type *H. merarcha*.

Shell globose, solid, narrowly umbilicated, with elevated spire and narrow, slowly widening whorls, the last deflexed in front. Aperture truncate-rounded, the entire lip reflexed, its ends joined by a callus. *Columella dilated, thickened and obtusely toothed within*. Typically

having a strong fold within the outer lip, marked outside by a deep pit, as in *Cepolis*. Type *C. merarcha*, pl. 39, figs. 9, 10.

Anatomy unknown. The two species are from Tonquin. The relations of the group are problematical, but judging from shell characters, it belongs near either *Obba* or *Camenella*.

C. merarcha Mab., vi, 235. *C. morleti* Dautz. & d'Ham., vi, 240.
mercatorina Mab., vi, 121.

Genus OBBA Beck, 1837.

Obba BECK, Index Moll. p. 30 (proposed for *H. planulata*, *papilla*, *mamilla*).—GRAY, P. Z. S. 1847, p. 172 (*H. planulata* selected as the type).—See also PILSBRY, Manual of Conch. vi, p. 211, and viii, p. 270.—*Gullina* HARTM., Erd u. Süßwasser Gast. Schweiz, 1840, p. 197 (*H. rota* Sowb.).—*Philina* (in part) ALBERS, Die Hel. 1850, p. 119 (preoc.).—*Pusiodon* SWAINS., in part.—*Obbina* SEMPER, Reisen im Archip. Phil., Landmoll., ii, p. 123 (type *H. planulata*), 1873.

Shell varying from trochoidal to depressed lens-shaped; carinated, at least in the young; umbilicated; the surface striated or wrinkled in the direction of growth-lines. Nucleus composed of about two polished whorls, not distinctly marked off from the after growth. Last whorl very deeply deflexed in front, aperture subhorizontal; ends of the expanded peristome approaching, and connected by a cord or raised callus; basal lip reflexed and often bearing a tooth. Whitish, buff or light brown, banded or speckled with brown. Type *O. planulata*, pl. 19, figs. 14, 15, 16. (See also pl. 19, fig. 17, *O. basidentata*).

Animal having a very broad flat foot, the tail short and quite flat, sole undivided; tentacles short (pl. 39, fig. 7, *O. planulata*).

Jaw smooth, without median projection, or with it small and blunt. Dentition: Central and inner lateral teeth having wide mesocones, no side cusps. Marginals developing a bifid mesocone and an ectocone, the outer marginals having both mesocone and ectocone split showing four short cusps, as in *Camenella platyodon*. (Pl. 39, fig 8, central and marginal teeth of *O. planulata*; pl. 39, fig. 6, an inner marginal of *O. basidentata*).

Genitalia lacking accessory appendages on the female side, the duct of the spermatheca short. Penis short, continued in a long epiphallus bearing the retractor muscle, vas deferens and a flagellum. The

cavity of the penis is strongly, irregularly plicate or papillose. It is encircled by a feather-like glandular appendix (pl. 39, fig. 12), the follicles of each side of which unite into two separate ducts sunken into the cavity of the penis (pl. 39, fig. 13, section of the gland). See pl. 39, fig. 11-13, *O. planulata*.

Distribution, Philippine Islands, with a few forms in northern Celebes, Halmaheira, and Ceram.

This group, like *Cochlostyla*, seems to have originated in the Philippine Island area. A few stragglers are found to the southward, as is also the case with *Camacua* and some other typically Philippine groups.

Obba differs from *Camacua* chiefly in the less capacious shell, with subhorizontal aperture and continuous peristome; in the possession of a glandular appendix on the penis, the short spermatheca duct, and the smooth jaw. It differs from *Planispira* in the raised parietal callus and the keel of the shell, which is characteristic of all the species when young, and most of them when adult. The teeth are like those of *Camacnella* and *Planispira*. The anatomy of *O. planulata*, *listeri* and *basidentata* has been examined by Sempér (Reisen, Landmoll., ii, p. 120); the jaw of *rota* by Mörch.

In Vol. VI of this work the writer stated that *Helix mamilla* was the type of *Obba*, following v. Martens. But in 1847 Gray selected *H. planulata* for the type. The genus must, therefore, be restricted to species allied to *planulata*.

(Group of *O. planulata*.)

- | | |
|--|---|
| <i>O. papilla</i> Müll., vi, 216. | <i>O. planulata</i> Lam., vi, 220. |
| v. <i>heroica</i> Pfr., vi, 217. | <i>auriculata</i> Swains. |
| <i>O. listeri</i> Gray, vi, 218. | <i>papilionacea</i> Val. |
| v. <i>costata</i> Semp., vi, 219. | <i>collapsus</i> Perry. |
| <i>O. gallinula</i> Pfr., vi, 219. | v. <i>sarcochroa</i> Pils., vi, t. 68, f. |
| v. <i>morongensis</i> Mlldff. viii, p. | [85. |
| [270. | <i>O. calcar</i> v. Mart., vi, 221. |

(Group of *O. moricandi*.)

- | | |
|--------------------------------------|---------------------------------------|
| <i>O. moricandi</i> Sowb., vi, 222. | <i>O. scrobiculata</i> Pfr., vi, 224. |
| <i>O. basidentata</i> Pfr., vi, 223. | <i>O. rota</i> Sowb., vi, 225. |
| <i>O. livesayi</i> Pfr., vi, 223. | <i>O. platyzona</i> Mlldff. |

(Group of *O. marginata*.)

- | | |
|---|---|
| <i>O. bigonia</i> Fér., vi, 226. | <i>O. kobeltiana</i> Pfr., vi, 228. |
| <i>samarensis</i> Pfr., olim. | <i>O. parmula</i> Brod., vi, 229. |
| <i>bizonia</i> H. & A. Ad. | <i>discus</i> Dh., vi, 230. |
| <i>O. marginata</i> Müll., vi, 227. | f. <i>obscura</i> Mlldff., vi, 230. |
| <i>grayana</i> Pfr. | f. <i>elevata</i> Mlldff., vi, 230. |
| <i>grayi</i> Hombr. & Jacq. | f. <i>trochroidea</i> Mlldff., vi, 230. |
| <i>scabrosa</i> Fér. | <i>O. bustoi</i> Hid., vi, 230. |
| v. <i>griseola</i> Mlldff., vi, 228. | <i>O. saranganica</i> Hid., vi, 230. |
| v. <i>sororecula</i> v. Mart., vi, 228. | <i>O. kochiana</i> Mlldff., vi, 231. |
| <i>devincta</i> Tap. Can. | <i>O. bulacanensis</i> Hid., vi, 226. |

(Group of *O. horizontalis*.)

- | | |
|---------------------------------------|--------------------------------------|
| <i>O. horizontalis</i> Pfr., vi, 232. | <i>O. lasallii</i> Eyd., vi, 233. |
| <i>O. reeveana</i> Pfr., vi, 233. | <i>meretrix</i> Sowb. |
| | <i>O. columbaria</i> Sowb., vi, 234. |

Subgenus? OREOBBA Pilsbry, 1894.

Janira ALBERS, Die Heliceen, 1850, p. 124, only species *H. codonodes*. Not *Janira* Leach, 1813 (Crustacea), of Oken, 1815 (acalepha) or of Schumacher, 1817 (*Pecten*).

Shell globose-conoidal, *bullet-shaped*, composed of about 5 whorls which are carinated in immature shells; the embryonal portion not differentiated; last whorl deflexed in front. *Surface shining, microscopically spirally striated*. Aperture truncate-rounded; entire lip well reflexed, at the columella expanded partly over the narrow umbilicus, and armed with a callous tooth on the inner edge. Type *H. codonodes* Pfr., pl. 19, fig. 11.

Animal unknown. *O. codonodes* inhabits the Nicobar Islands. It resembles the Philippine Island group *Phenicobius* in contour, but not in texture or minute sculpture, nor in the apical whorls. The sculpture is like that of the *Obba horizontalis* group. Of the two species I have seen only *codonodes*. A knowledge of the anatomy is necessary to the exact location of this group in the system. It cannot, in my opinion, be united to *Phenicobius*.

- | | |
|------------------------------------|----------------------------------|
| <i>O. codonodes</i> Pfr., vi, 236. | <i>O. camelus</i> Pfr., vi, 237. |
|------------------------------------|----------------------------------|

Genus PLANISPIRA Beck, 1837.

= *Planispira* + *Cristigibba* + *Angasella* + *Trachia* + *Eurystoma*.

Planispira BECK, Index Moll., subg. 25, p. 29.—MARTENS in Albers' Die Heliceen, p. 160, type *H. zonaria* L.—SEMPER, Reisen, im Arch. Phil., Landmoll., p. 120.—TAPPARONE-CANEFRI, Ann. Mus. Civ. Genov. xix, p. 162, 181, 1883.—PILSBRY, Manual, vi, p. 274.—*Pusiodon* (in part) SWAINS., Malacol., p. 330 (for *H. zonaria* and *auriculata*).—*Philina* (in part) ALBERS, Die Hel., p. 119.

Shell depressed, generally umbilicated, having four to five rapidly widening whorls, *the first not granulated nor marked by hair points, the last deeply deflexed in front.* Aperture very oblique or subhorizontal; outer and upper lips expanded, basal lip reflexed, often toothed. Type *P. zonaria* L., pl. 12, figs. 4, 5, 6.

Animal having the sole undivided (pl. 12, fig. 2, *P. zonaria*).

Genital system lacking all accessory organs on the female side, the large spermatheca situated on a very long duct. Penis thick and long, the retractor muscle apparently inserted at its apex; epiphallus ending in a short flagellum (pl. 12, fig. 1, *P. zonaria*).

Jaw smooth, arcuate (pl. 12, fig. 7 *P. zonaria*.)

Middle tooth and inner laterals with a single obtuse cusp; outer laterals and marginal teeth with the ectodont developed (pl. 12, fig. 3, *P. zonaria*).

Distribution, southern Celebes, Moluccas, New Guinea; aberrant groups extending over the Indo-Malayan and part of the Australian regions.

This genus differs from *Chloritis* in the white or pale colored, banded shell, very oblique aperture, and lack of quincuncial sculpture on the apex, and in the smooth jaw. It differs from *Papuina* in the depressed earlier whorls of the shell and the ribless jaw. It agrees with *Obba* in the jaw, but differs in lacking an appendix upon the penis, and in the typically thinner, smoother shell, depressed at the apex.

The anatomy is imperfectly known from the work of Semper and Tapparone-Canefri. Investigation should be directed to the penis in order to ascertain whether a papilla is present (denied by Semper), the true limits of penis proper and epiphallus, and the point of insertion of the penis retractor. v. Martens describes the jaw of *P. loxotropis* as weakly ribbed. It is probable that the complete absence

of ribs will prove to be a character not without exceptions in this, as in some allied genera.

The genus is divided into four well-defined subgenera :

* *Shell white or light colored, generally banded, smooth, the earlier whorls flat or concave.*

Subgenus *PLANISPIRA* (restricted). Shell with no crest-like ridge behind the lip; aperture decidedly wider than high, the basal lip usually somewhat thickened or toothed. Penis having a flagellum.

Subgenus *CRISTIGIBBA* Tap.-Can. Shell with a crest or swollen ridge behind the lip; aperture about as high as wide, the basal lip narrow, not thickened or toothed. Penis very short, the retractor and vas deferens inserted at its apex; no flagellum.

** *Shell often roughly sculptured, the earlier whorls not especially depressed.*

Subgenus *ANGASELLA* A. Ad. Shell depressed, the whorls tubular, costulate or granulated; aperture rounded or angular, the lip well expanded, reflexed below. Australian species.

Subgenus *TRACHIA* Alb. Shell varying from discoidal to depressed globose, generally banded on an opaque whitish ground. Last whorl deeply deflexed in front. Lip expanded, reflexed below. Anatomy as in *Planispira* except that the jaw is ribbed. Indo-Malayan species.

Subgenus *PLANISPIRA* Beck.

Anatomy described above.

(Group of *P. zonaria*).

- | | | |
|--|---|-------|
| <i>P. zebra</i> Pfr., vi, 275. | <i>v. instricta</i> Mart. | [280. |
| <i>guttata</i> LeGuill. | <i>edentata</i> Mart. | |
| <i>v. embrechtiana</i> Mouss., vi, | <i>P. aurita</i> Mart., vi, 281. | |
| <i>P. iaddæ</i> Pils., vi, 276. | [275. <i>P. biconvexa</i> Mart., vi, 281. | |
| <i>P. halmaherica</i> Strub., viii, 284. | <i>P. scheepmakeri</i> Pfr., vi, 282. | |
| <i>P. chariessa</i> Pils., vi, 279. | <i>P. zonaria</i> Linn., vi, 277. | |
| <i>P. quadrifasciata</i> LeGuill., vi, | <i>f. lineolata</i> Mart. | |

- | | |
|---------------------------|--|
| <i>P. zonaria</i> Linn. | <i>v. fasciata</i> Mart. |
| <i>f. fulminata</i> Mart. | <i>f. collis</i> Mouss. |
| <i>f. obliquata</i> Mart. | <i>f. nitidiuscula</i> Bttg., viii, 284. |
| <i>f. maculosa</i> Mart. | <i>v. fasciolata</i> Less. |
| <i>f. coluber</i> Beck. | <i>v. martini</i> Schepm. Leyd. Mus. |
| <i>lunulata</i> Mart. | [xv. |

(Group of *P. endoptycha*).

- | | |
|--------------------------------------|--------------------------------------|
| <i>P. endoptycha</i> Mart., vi, 282. | <i>P. porcellana</i> Grat., vi, 283. |
| <i>? comptu</i> H. Ad. | |

(Group of *P. zonalis*).

- | | |
|------------------------------------|-------------------------------------|
| <i>P. zonalis</i> Fér., vi, 284. | <i>P. loxotropis</i> Pfr., vi, 285. |
| <i>leucostoma</i> A. & R. | <i>f. bernsteinii</i> Mart. |
| <i>P. atrofusca</i> Pfr., vi, 285. | <i>f. laticlavaria</i> Mart. |
| <i>P. latizona</i> Pfr., vi, 285. | <i>f. angusticlavaria</i> Mart. |
| <i>P. ataeta</i> Pfr., vi, 287. | <i>f. pluricincta</i> Mart. |
| | <i>v. lorquini</i> Pfr., vi, 286. |

(Group of *P. kurri*).

- | | |
|--|-------------------------------------|
| <i>P. kurri</i> Pfr., vi, 287. | <i>P. surrecta</i> Bttg. |
| <i>P. tietzeana</i> Rolle, Nachrbl. '93, | <i>P. flavidula</i> Mart., vi, 288. |
| [p. 33. | <i>flaveola</i> Mts. not Kryn. |

(Group of *P. exceptiuncula*).

- | | |
|--|---------------------------------|
| <i>P. exceptiuncula</i> Fér., vi, 289. | <i>P. thetis</i> Pfr., vi, 290. |
| <i>f. phryne</i> Pfr. | (see Nachrbl. 1892, p. 43). |
| <i>f. aspasia</i> H. Ad. | |

Subgenus CRISTIGIBBA Tapparone-Canevari.

Cristigibba T.-C., Ann. Mus. Civ. Genov. xix, 1883, p. 161.

With the general appearance of *Planispira*, these shells differ in having a crest or swollen ridge behind the lip, or a strong swelling on the base immediately behind the constriction preceding the lip. The spire is flat, a little concave in the middle. Type *P. corniculum*. (See pl. 12, fig. 13-15, *C. macgregori* Hedley.).

The group is characteristic of New Guinea, but a few species range as far north as Ceram, Batjan, and even Borneo and Sumatra.

Jaw arcuate, smooth (pl. 12, fig. 9, *C. dominula*). In *C. macgregori* the lower margin shows traces of denticulation, and the median portion is transversely wrinkled (pl. 12, fig. 11).

Central and inner. lateral teeth with a single cusp, shorter than the basal-plates. Marginals having a long, oblique, bifid mesocone and a small ectocone.

Genital system like that of *Planispira* on the female side. Penis *extremely short, stout, the retractor and vas deferens inserted at its apex* (pl. 12, fig. 8, *P. plagiocheila*; pl. 12, fig. 12, *P. dominula*).

In this group the epiphallus and flagellum have evidently been lost by degeneration. The anatomy of several species is known through the researches of Tapparone-Canefri and Charles Hedley.

The following list of species will probably suffer considerable reduction when sufficient material for comparative study is brought together.

(Group of *P. corniculum*).

- | | |
|--|--|
| <i>P. corniculum</i> H. & J., vi, 291. | <i>P. deaniana</i> Ford, vi, 292. |
| ? <i>kiesneri</i> LeGuill. | <i>P. dominula</i> Tap.-Can., vi, 293. |
| <i>P. purpurostoma</i> LeGuill., vi, | <i>P. macgregori</i> Hedl., viii, 285. |
| [177. | |

(Group of *P. tortilabia*).

- | | |
|--|---------------------------------------|
| <i>P. tortilabia</i> Less., vi, 294. | <i>P. rhodomphala</i> T.-C., vi, 297. |
| <i>torticollis</i> (LeGuill.), T.-C. | <i>P. semirasa</i> Mouss., vi, 295. |
| <i>gibbosula</i> H. & J. | <i>moluccensis</i> Pfr. |
| <i>P. plagiocheila</i> T.-C., vi, 295. | <i>P. leptocheila</i> T.-C., vi, 296. |

(Group of *P. margaritis*).

- | | |
|--------------------------------------|--|
| <i>P. margaritis</i> Pfr., vi, 297. | <i>P. expansa</i> Pfr., vi, 298. |
| v. <i>zonulella</i> Mouss. | <i>mozona</i> Mart. |
| <i>P. mersispira</i> Mart., vi, 298. | <i>P. quadrivolvus</i> Mart., vi, 299. |

Subgenus ANGASELLA A. Ad.

Angasella A. AD., P. Z. S. 1863, p. 521, only species, *cyrtopleura*. *Pleuroxia* ANCEY, Conchologists' Exchange, ii, p. 38 (Sept., 1887), same type. Not *Angasiella* Crosse, 1864 (Nudibranchiata).

Shell depressed, umbilicated, plicate-striate; whorls 4 to 5, the last wide, deflexed in front. Aperture oblique, oval-truncate, the

peristome expanded, reflexed below, not toothed, margins approaching and joined by a parietal callus. Type *P. cyrtopleura*, pl. 19, figs. 20, 21, 22.

Distribution, South Australia. Anatomy unknown.

This group contains snails allied to the *P. tuckeri* group of the islands off the north coast of Australia, but modified by the conditions of life in an arid region. Still it is doubtful whether the separation of the two groups serves any useful purpose.

Species.

- | | |
|--------------------------------------|-------------------------------------|
| <i>P. cyrtopleura</i> Pfr., iv, 65. | <i>P. eyrei</i> Ad. & Ang., iv, 66. |
| <i>P. phillipsiana</i> Ang., iv, 66. | <i>P. subsecta</i> Tate, iv, 66. |

Section *Trachiopsis* Pilsbry.

Trachiopsis PILS., Manual of Conch. viii, p. 284.

Shell small, depressed, umbilicated, the whorls rather cylindrical, covered with a brown cuticle, the last deflexed in front and more or less constricted behind the lip. Aperture round or angular, oblique, the lip thin, well expanded or reflexed, sometimes toothed. Type *P. tuckeri* Pfr., pl. 19, fig. 18, 19.

Anatomy unknown. These small Planispira-like shells have hitherto been classed in *Trachia*, an Indian group. They inhabit the northern coast of Australia and adjacent islands. It is doubtful whether this group should be separated from *Angasella*. It differs mainly in the lighter, thinner texture of the shell, and the tendency to form a tooth upon the basal lip.

- | | |
|--|---|
| <i>P. tuckeri</i> Pfr. iv, 65. | <i>P. delessertiana</i> LeGuill., iv, 66. |
| <i>strangulata</i> H. & J. | <i>taranaki</i> Gray. |
| <i>P. cyclostomata</i> LeGuill., iv, 65. | <i>torresiana</i> H. & J. |
| <i>P. dentoni</i> Ford, viii, 285. | <i>P. endeavorensis</i> Braz., P. Z. S. |
| <i>P. dryanderensis</i> Cox, P. Z. S., | [1871, 640. |
| [1872, p. 19. | <i>P. baudinensis</i> Smith, viii, 286. |
| | <i>P. collingii</i> Smith, viii, 287. |

Subgenus *TRACHIA* Albers, 1860.

Trachia ALB., Die Hel., edit. 2, p. 160.—STOLICZKA, Journ. Asiat. Soc. Beng. xl, (2), p. 223 (anatomy).—*Eurystoma* ALB., Die Hel. 1850, p. 126; edit. 2, 1860, p. 129, type *H. vittata*.—Cf. SEMPER,

Reisen im Archip. Phil., Landmoll., p. 163, anatomy of *H. vittata*.—Not *Eurystoma* Raf. 1818, nor *Eurystomus* Vieill., 1816.—*Philidora* de MORGAN, Bull. Soc. Zool. France, 1885, p. 384 (proposed for *P. wrayi* and *hardouini*).

Shell varying from discoidal to depressed-globose, umbilicate, the surface rather roughly sculptured, hairy when young, microscopically granulated, sometimes ribbed when adult; the apex typically showing no distinct sculpture. *Last whorl strongly deflexed in front.* Aperture very oblique, small, the lip well expanded, reflexed below, *the terminations approaching* and sometimes connected by a raised callus. Type *P. asperella*, pl. 19, fig. 25. (See also pl. 19, fig. 24, *P. vittata*; and pl. 19, fig. 23, *P. vittata* var. *spinolæ*).

Animal (of *P. delibrata*) having the left body-lappet of the mantle represented by a simple thickening; right lappet reaching anteriorly over the back and rapidly becoming narrower below. In *P. vittata* the sole is indistinctly tripartite.

Jaw arcuate, the entire anterior surface ribbed, the seven median ribs stronger (pl. 32, fig. 44, *P. delibrata*. Pl. 34, fig. 5, *P. trochalia*). In *P. vittata* there are five very high ribs, strongly denticulating the margin.

Radula (of *P. delibrata*) very long, with 124 transverse rows of 22 (to 18) 20.1.20.18 (to 22) teeth. Central and inner lateral teeth with a large mesocone and obsolete side cutting-points; outer laterals and marginal teeth with the ectocone developed. In *P. vittata* the formula is about the same; central and inner 14 laterals unicuspid; outer laterals with an ectocone. At the 25th tooth the mesocone becomes bifid, and outwardly the bifid mesocone becomes shorter, the outermost marginals having three subequal cusps. See also pl. 34, fig. 4, *P. asperella*, and pl. 34, fig. 6, *P. trochalia*.

Genitalia having the female side free from all accessory organs, the duct of the spermatheca very long. Penis terminating in an epiphallus near the root of which the retractor is inserted; epiphallus long, terminating in a short flagellum and the vas deferens (pl. 32, fig. 45 *P. delibrata*). The genitalia of *P. vittata* are similar; penis with a spirally coiled flagellum. In *P. penangensis* (pl. 42, fig. 6) the penis bears an epiphallus ending in a short flagellum, and has an accessory sack, perhaps an "appendix."

Distribution, India, Burmah, Ceylon, Mergui Archipelago and Sumatra.

These shells are characterized by the deeply descending whorl at the aperture, and the strongly converging ends of the lip. The anatomy is in essential agreement with either *Chloritis* or *Planispira*, although the strong ribbing of the jaw is most like the former group. On the other hand, the general form of the shell, the deep descent of the last whorl to the very oblique aperture, and the system of coloring, agree more nearly with *Planispira*. The sculpture of the shell varies considerably in the different species. The more typical, such as *fallaciosa*, *nilagirica*, *proxima*, as well as *vittata* exhibit an apparently smooth apex; but *propinqua*, *tanqueryi* and a few others, show an excessively fine quincuncial punctication of the apical whorls, such as occurs in *Chloritis*, in combination with the characteristic shell contour of *Trachia*. Until we know by the examination of numerous species, how and to what extent the characters of jaw and genitalia are correlated with the above-mentioned shell structures, no consistent zoologist will be justified in drawing rigid lines of demarcation between the *Chloritis* and *Planispiras* of southeastern Asia. It is better to frankly recognize the fact that in this area the two groups are represented by some forms which, so far as shell characters show, are undifferentiated or separated by feeble characters only.

(Group of *P. fallaciosa*).

- | | |
|------------------------------------|--|
| <i>P. albicostis</i> Pfr., iv, 65. | <i>P. helferi</i> Bens., iv, 63. |
| <i>P. asperella</i> Pfr., iv, 62. | <i>P. nilagirica</i> Pfr., iv, 65. |
| <i>granifera</i> Bens. | <i>P. penangensis</i> Stol., iv, 63. |
| <i>P. atkinsoni</i> Theob., iv, 56 | <i>P. proxima</i> Fér., iv, 63. |
| <i>P. contracta</i> Hutt., iv, 65. | <i>P. ruginosa</i> Fér., iv, 63. |
| <i>P. delibrata</i> Bens., iv, 64. | v. <i>crassicostata</i> Bens., iv, 64. |
| <i>procumbens</i> Gld. | <i>P. sordida</i> Pfr., iv, 65. |
| v. <i>fasciata</i> G.-A., iv, 64. | <i>P. vittata</i> Müll., iv, 120. |
| v. <i>khasiensis</i> Nev., iv, 64. | <i>zonula</i> Wood. |
| <i>P. fallaciosa</i> Fér., iv, 64. | v. <i>spinolæ</i> Villa, iv, 120. |
| <i>P. footei</i> Stol., iv, 64. | |

(Group of *P. gabata*).

- | | |
|-------------------------------------|--|
| <i>P. trochalia</i> Bens., vii, 88. | <i>P. pilisparsa</i> Mart., viii, 192. |
| <i>bigsbyi</i> Tryon. | <i>P. smithii</i> Bock, iv, 57. |
| <i>P. gabata</i> Gld., iv, 57. | <i>P. wrayi</i> Morg., vii, 86. |
| v. <i>merguensis</i> Phil. | <i>P. hardouini</i> Morg., vii, 86. |

Genus CHLORITIS Beck, 1837.

Chloritis BECK, Index Moll. subg. 24, p. 29.—GRAY, P. Z. S. 1847, p. 172, type *H. unguina*.—v. MART., in Alb., Die Hel. 1860, p. 161, type *H. unguina* L.—*Erigone* ALB., Die Hel. 1850, p. 92 (for *discordialis* Fér.).—*Semicornu* "Klein," H. & A. ADAMS, Gen. Rec. Moll. ii, p. 202, 1855.—Cf. PILSERY, Man. of Conch. vi, p. 242; viii, p. 270; and v. MOELLENDORFF, P. Z. S. 1891, p. 335, 336.—*Sulcobasis* Tap.-Can., *Austrochloritis* Pils., *Trichochloritis* Pils. and *Plecteulota* Mildff.

Shell varying from *discoidal and biconcave* to depressed subglobose with convex spire; the apical whorl flattened or sunken, and showing under a lens *regularly arranged granules or hair-points*, which often persist over the whole shell. Aperture lunate, the lip reflexed. Type *C. unguina* L., pl. 29, figs. 1, 2, 3.

Animal (of *C. porteri*) with undivided sole, the edges of the foot lacking a foot border; sides irregularly granulated; tail rounded, *above with an impressed longitudinal median line*; back from mantle to head having a few longitudinal grooves. Mantle edge bearing a small right body-lappet.

Jaw strong and ribbed.

Radula having the middle cusp only developed on central and inner lateral teeth, the cutting points about as long as the basal plates; side cusps completely absent, but represented by small cutting points. Lateral teeth with a long, oblique, bifid mesocone and a small ectocone.

Genital system characterized by the lack of dart sack or other accessory organs on the female side, the spermatheca duct rather long and closely bound to the uterus. Penis without appendix, its cavity containing at the apex an imperforate fleshy papilla (pl. 28, fig. 2), situated beside the opening of the epiphallus; epiphallus (pl. 28, figs. 1, 2, *C. porteri*) long, the penis retractor inserted upon it; terminating in a flagellum and vas deferens.

Distribution, Northern Australia and Solomon Is., north to southern China. No fossil forms are known. All of the species live upon the ground, as far as known.

The genus *Chloritis* was originally proposed for flat, biconcave Helices; but modern systematists have widened the group to contain allied forms having the spire convex. Early in 1891 the writer discussed the group, fixing upon the previously unnoticed character of a *quincuncially granulated apex* as the true generic

criterion, and considerably widening the limits of the genus. At about the same time Dr. v. Möllendorff redefined *Chloritis*, and concluded that the sculpture of "impressed points placed in quite regular quincunx," and the presence of a "keel or angle round the umbilicus" were diagnostic generic characters. In this connection it should be noticed that the hairs or hair-points are totally lacking upon the outer whorls of many undoubted *Chloritis*, and that the umbilical angle completely fails in *C. circumdata*, *maforensis*, *percussa*, etc. It therefore appears that the most we can say of the sculpture is: *apical whorls and usually the whole shell sculptured with hair-points arranged in quincunx*. It is probable that when hairs or hair-points are present on the last whorl, they are *always* disposed in regular oblique sweeps or quincunx, but this cannot be said to be demonstrated. Some species show a granulation between the hair points. The European Oligocene and Miocene species which have been referred to *Chloritis*—such as *H. lepidotricha* A. Br., have no relationship to the Oriental *Chloritis*; the *H. lepidotricha* is a *Campylaea*. In this connection it must be emphatically stated that while the character of surface-sculpture discussed above distinguishes *Chloritis* from other groups inhabiting the same quarter of the globe, it is not in itself a feature of much importance, nor in itself diagnostic of this genus alone. In Europe the hairy forms of the *Campylaea planospira* group (as well as some other *Campylæas*, such as *setosa* Ziegl.) show absolutely the same surface sculpture, from the apex out. On the other hand, the Australian group *Hadra* is extremely close to *Chloritis* in anatomy, but lacks the quincuncial sculpture. We may, therefore, regard the quincuncially arranged hairs as a secondary character, which has arisen independently in several widely different groups of *Helices*. The function of the hairs is evidently to gather dirt, thus disguising the snail from its bird enemies.

Chloritis has the essential internal organization of *Camæna*, *Camænella*, etc. It differs from these groups and from *Obba*, mainly in the non-differentiation of the embryonal whorls, and the smaller size of the shell at the time its independent life begins. The species referred by Semper to *Chloritis* belong to an entirely different group. His anatomical characterization of the genus therefore falls.

Chloritis may be divided into several sectional groups—*Chloritis*, *Sulcobasis*, *Austrochloritis*, *Trichochloritis*—probably natural, but

blending at their confines into one another. The typical forms of the first two represent the more divergent and presumably modern lines of differentiation.

Section *Chloritis* (restricted).

Shell with the spire sunken, flat or somewhat convex with flat earlier whorls. Type *C. unguina*, pl. 29, figs. 1, 2, 3.

But two species of the typical group of *Chloritis* have been investigated anatomically, *C. dinodeomorpha* Tap.-Can., Ann. Mus. Civ. Genov. xix, 1883, p. 168, and *C. leei* Cox, Hedley, Proc. Linn. Soc. N. S. W. (2), vi, p. 687. They agree essentially with *Austrochloritis*, q. v.

Jaw arcuate, having about 8 strong ribs separated by narrow intervals (pl. 32, fig. 43, *C. leei*). Central and inner lateral teeth unicuspid; marginal teeth having a long bifid mesocone and an ectocone. Genitalia lacking appendages on the female side, the duct of the spermatheca long. Penis long, the retractor apparently inserted at its apex; epiphallus very long, dilated where it receives the vas deferens, and ending in a flagellum (pl. 28, fig. 10, *C. dinodeomorpha*, after Tap.-Can.; pl. 32, fig. 42, *C. leei*, after Hedley).

Distribution, New Guinea and Moluccas (typical forms); Solomons, New Ireland, Louisiades and Celebes (divergent forms).

(Group of *ungulina*.)

- | | |
|--|--|
| <i>C. unguina</i> Linn., vi, 243. | <i>C. biomphala</i> Pfr., vi, 244. |
| v. <i>minor</i> Fér. | <i>C. martensi</i> Pfr., vi, 244. |
| <i>C. unguiculina</i> v. Mart., vi, 244. | <i>C. cheratomorpha</i> Tap.-Can., vi, [245. |

(Group of *circumdata*.)

- | | |
|--|---|
| <i>C. circumdata</i> Fér., vi, 246. | <i>C. mafeorensis</i> Tap.-Can., vi, 247. |
| v. <i>molliseta</i> Pfr., vi, 246. | v. <i>micromphalus</i> Pils., vi, 247. |
| <i>C. lansbergiana</i> Dohrn, vi, 247. | |

(Group of *unguicula*.)

- | | |
|---------------------------------------|-------------------------------------|
| <i>C. unguiculastra</i> v. Mart., vi, | <i>C. ceramensis</i> Pfr., vi, 249. |
| v. <i>buruensis</i> Mart. [248. | <i>C. unguicula</i> Fer., vi, 249. |
| v. <i>amboinensis</i> Mart. | <i>goldii</i> Mörch. |
| v. <i>pilosa</i> Mart. | <i>C. gruneri</i> Pfr., vi, 250. |
| <i>C. flexuosa</i> Pfr., vi, 249. | <i>C. exacta</i> Pfr., vi, 250. |

(Group of eustoma.)

- | | |
|---|--|
| <i>C. erinacea</i> Pfr., vi, 251. | <i>C. ursina</i> Pfr., vi, 253. |
| <i>C. leei</i> Cox, vi, 251. | <i>C. dinodeomorpha</i> Tap.-Can., vi, |
| v. <i>sudestensis</i> Hedley. | [254. |
| <i>C. subcorpulenta</i> Sm., vi, 251. | <i>C. delphax</i> Dohrn, viii, 271. |
| <i>C. discordialis</i> Fér., vi, 252. | <i>C. silenus</i> Angas, vi, 254. |
| <i>C. eustoma</i> Pfr., vi, 252. | <i>C. gaimardi</i> Dh., vi, 255. |
| <i>C. dentrecasteauxi</i> Sm., vi, 253. | <i>adustus</i> Hinds. |
| | <i>C. mendanæ</i> Cox, vi, 255. |

(Group of tuba—Celebes species.)

- | | |
|-------------------------------------|-----------------------------------|
| <i>C. bulbulus</i> Mouss., vi, 258. | <i>C. tuba</i> Alb., vi, 258. |
| <i>bulbus</i> Mouss. | <i>C. zodiacus</i> Fér., vi, 259. |

Section *Sulcobasis* Tap.-Can.

Sulcobasis T.-C., Annali del Museo Civico di Storia Naturale di Genova, xix, 1883, p. 161.

Shell *large, solid*, globose-depressed or depressed; spire convex, the inner whorls (and apex when not worn) showing minute hair-scars arranged in oblique series; body-whorl more or less distinctly spirally sulcate beneath. Lip well reflexed. Type *C. sulcosa* Pfr., pl. 29, figs. 9, 10.

Distribution, Aru Is., New Guinea, New Ireland, Solomon Is.

Anatomy unknown. Tapparone-Canefri has given a crude figure of the central and inner lateral teeth of *C. beatricis*, showing them to lack side cusps, as usual in the genus. Doubts have been expressed as to the relationship of this group of large solid Helices to *Chloritis* (Jahrb. D. M. G. 1892, p. 94); but those who see the shells themselves, will agree with Tapparone-Canefri that the group is simply a section of *Chloritis*.

(Typical group).

- | | |
|---|---|
| <i>C. sulcosa</i> Pfr., vi, 260. | <i>C. lepidophora</i> Dohrn. viii, 273. |
| <i>C. rubra</i> Alb., vi, 260. | <i>C. rehsei</i> v. Mart., vi, 261. |
| <i>C. concisa</i> Fér., vi, 262. | <i>gerrardi</i> Sm. |
| <i>C. beatricis</i> Tap.-Can., vi, 260. | <i>genardi</i> Braz. |
| <i>C. rohdei</i> Dohrn, viii, 273. | v. <i>obtecta</i> Reinh., vi, 262. |

(Aberrant group).

- C. bougainvillei* Pfr., vi, 128. *C. quercina* Pfr., vi, 257.
 angasiana Newc. v. *hombroni* Pfr., vi, 258.
C. majuscula Pfr., vi, 255. *janellii* Hombr. & Jacq.
C. isis Pfr., vi, 256.

Section *Austrochloritis* Pilsbry.

Austrochloritis PILS., Man. of Conch. vi, p. 262.—? *Plecteulota* v. MOELL., Jahrb. D. M. Ges. 1892, p, 92, type *Eulota goniostoma* Mlldff.

Shell rather small, depressed, but with convex spire and obtuse apex, umbilicated, unicolored; surface hairy or *marked with regular series of hair-scars to the apex*. Aperture round-lunar, the lip expanded, thin, ends of peristome converging; sutures well-impressed. Type *C. porteri* Cox, pl. 29, figs. 4, 5.

Animal (see under *Chloritis*).

Jaw arcuate, with numerous ribs (pl. 28, fig. 3, *C. porteri*).

Dentition: Central and inner lateral teeth with the mesocones only developed, slight lateral cutting-points upon it representing the absent ectocones. Marginals having a long, oblique mesocone and a small ectocone (pl. 28, fig. 4, *C. porteri*).

Genitalia (of *C. porteri*) lacking all accessory appendages on the female side; spermatheca lying beside the albumen gland, its duct therefore very long, bound closely to the oviduct throughout its length. Penis club shaped, the walls of its cavity corrugated, with a large, fleshy papilla at the apex, beside the opening of the epiphallus (pl. 28, fig. 2). Epiphallus long; the retractor inserted at its middle; ending in a rather long flagellum. Penis retractor attached to the floor of the lung cavity; right eye-peduncle retractor passing between primary branches of genitalia (pl. 28, fig. 1 *C. porteri* Cox. Fig. 2 penis of same opened, epiphallus and flagellum).

Distribution, Queensland, New Guinea and adjacent islands.

The anatomy of *P. porteri* has been investigated by Hedley (Proc. Roy. Soc. Queensl. vi, pl. 15) and by myself (see above). The jaw and teeth of *C. chloritoides* have been figured by Hedley (Proc. Linn. Soc. N. S. W. (2), vi, pl. 39, 40). The anatomy of *C. argillacea* has been described and figured by Wiegmann, in Webers' Zool

Ergebnisse einer Reise in Niederländisch Ost-Indien, III, p. 171. Part of his figures are reproduced on pl. 28, figs. 5-9. The epiphallus bears a short accessory organ (shown below the penis retractor in fig. 8, above it in fig. 9) of unknown homology and function. Otherwise the jaw, teeth and genitalia agree with *C. porteri*.

The section *Plecteulota* of v. Möllendorff, considered by him to be a subordinate group of *Eulota*, probably belongs here. Its type *Plecteulota goniostoma* Mlldff. is shown in pl. 29, figs. 6, 7.

Small, thin-shelled forms, having much the aspect of *Eulotella*, from which they differ in the sculptured apex and the lack of dart-sack and the associated mucus gland or glands. It is in actual practice, however, extremely difficult to tell what shells to refer to *Eulotella*, what to *Chloritis*; and the most experienced conchologists differ in their treatment of the forms. Most of the shells now included in *Austrochloritis* were placed by Pfeiffer in *Dorcasia* and *Camæna*; and v. Möllendorff has expressed the opinion that part of them are to be referred to *Eulota* (*plus* *Plecteulota*, *Eulotella*, etc.). In regard to these conflicting opinions, the writer has only this to say: the groups *Eulota* and *Austrochloritis*, notwithstanding their superficial similarity, belong to widely different branches of the *Helix* stock. Controversy respecting the generic position of certain species known by the shells alone is idle; for the anatomy only can give a true answer to our questioning.

(*Australian species*).

- | | |
|-------------------------------------|--|
| <i>C. spinei</i> Cox, vi, 263. | <i>C. aridorum</i> Cox, vi, 266. |
| <i>hystrix</i> Cox, preoc. | <i>C. pseudoprunum</i> Pils., viii, 271. |
| <i>C. porteri</i> Cox, vi, 263. | <i>prunum</i> auct. not Fér. |
| <i>C. mansueta</i> Cox, vi, 264. | <i>C. coxeni</i> Cox, viii, 272. |
| <i>C. blackalli</i> Braz., vi, 264. | <i>C. bennetti</i> Braz., vi, 135. |
| <i>C. buxtoni</i> Braz., vi, 265. | <i>C. blackmani</i> Cox, vi, 137. |
| <i>C. brevipila</i> Pfr., vi, 265. | <i>C. coxenæ</i> Braz., vi, 138. |
| | <i>C. mucida</i> Pfr., vi, 148. |

(*Species of New Guinea, etc.*).

- | | |
|---|--|
| <i>C. occulta</i> Pfr., vi, 266. | <i>C. telitecta</i> Mlldff., viii, 222. |
| <i>C. chloritoides</i> Pils., vi, 267. | <i>C. tenuitesta</i> Mlldff., viii, 273. |
| <i>C. rhodochila</i> Mlldff., viii, 273. | <i>C. argillacea</i> Fér., iii, 210. |
| <i>C. micholitzii</i> Mlldff., viii, 272. | <i>cyclostomopsis</i> Lea. |
| <i>C. goniostoma</i> Mlldff., viii, 221. | <i>C. mendax</i> Martens, iii, 212. |

Section *Trichochloritis* Pilsbry.

Trichochloritis PILS., Manual of Conch., vi, p. 267.

Shell depressed, rather thin, the spire low-convex or flat, the base generally obtusely angled around the umbilicus. Epidermis not deciduous; apex and the whole shell hirsute or marked by hair-scars arranged in regular lines; lip thin, expanded or narrowly reflexed. Type *C. breviseta* Pfr.

Anatomy unknown. Distribution, Southern China to Borneo.

As I have written in this work (vi, p. 242) and von Möllendorff has emphasized (Nachr., 1892, p. 94), the sections of *Chloritis* stand "auf etwas schwachen Füßen." In other words, the series seems to intergrade by rather easy stages throughout, not even excepting *Sulcobasis*. Disclaiming any desire to supply crutches to a section which cannot stand upon its own merits, I still retain the name *Trichochloritis* for the group of small, thin species having the same distribution as *Camaena*, believing it a convenient division. When enough species are known anatomically to show the true classification of *Chloritis* and the line dividing that genus from *Trachia* and *Eulotella*, I shall be among the first to discard the present arbitrary system.

The genital system of *C. crassula* has been figured by Wiegmann (Zool. Ergebnisse einer Reise in Niederländisch Ost-Indien. iii, pl. 13, f. 10). It resembles that of *C. portei* except that the enlargement at the apex of the penis is long and curved—so long that Wiegmann calls it a penis gland, although in my opinion, it is not glandular, but simply a pouch-like enlargement of the penis for the accommodation of a large imperforate papilla.

The epiphallus bears the retractor, and is continued beyond the insertion of the vas deferens in a short flagellum. The duct of the spermatheca is much and abruptly swollen at the base and this swelling is doubtfully interpreted as a dart-sack and mucus gland by Wiegmann, who did not open it, however. If his view is correct, the species must be an *Eulotella*; but I prefer to consider the structure as a mere muscular enlargement of the spermatheca duct, probably with plicate internal walls, such as is often found in the *Helices*. The union of dart-sack with spermatheca duct would be an extremely unusual character, if confirmed.

(Continental species).

- | | |
|-----------------------------------|-----------------------------------|
| C. hungerfordiana Nev., iii, 182. | C. lemeslei Morl. |
| C. miara Mab., vi, 270. | C. balansai Morl., viii, 218. |
| C. herziana Mlldff., vi, 271. | C. quinaria Pfr., vi, 269. |
| C. rhinocerotica Hde., vi, 271. | <i>quinaria</i> Pfr. |
| C. franciscanorum Gred., viii, | C. shanica Bedd., viii, 275. |
| [217. | C. colletti Bedd., viii, 274. |
| C. seriatisetia Roch., vi, 268. | C. bifoveata Bens., vi, 245. |
| C. malayana Mlldff., viii, 274. | C. nautiloides Val., iii, 212. |
| C. percussa Hde., vi, 111. | C. samuiana Mlldff. |
| C. breviseta Pfr., vi, 268. | C. tanqueryi C. & F., iv, 64. |
| C. tenella Pfr., vi, 269. | C. condoriana C. & F., vi, 269. |
| C. submissa Desh., iii, 182. | C. norodomiana Morl., vi, 270. |
| C. deliciosa Pfr., vi, 113. | C. fouresi Morl., J. de C., 1889, |
| C. remoratrix Morl., viii, 274. | C. propinqua Pfr., iv, 63. [176. |

(Species of Borneo, Java, etc.).

- | | |
|--|------------------------------|
| C. crassula Phil., viii, 271. | C. hemiopta Bens., vi, 238. |
| <i>storiana</i> Mouss. | C. meander G.-A., viii, 275. |
| C. cryptopila Marts., iii, 211. | C. plena G.-A., viii, 276. |
| v. <i>helicinoides</i> Mouss., iii, 211. | C. sibuensis Sm., Ann. Mag., |
| C. everetti H. Ad., iii, 211. | [1894, p. 53. |
| | C. tomentosa Pfr., iii, 212. |

(Philippine Island species).

- | | |
|-------------------------------------|-------------------------------|
| C. brevidens Pfr., vi, 272. | C. quieta Rve., vi, 271. |
| C. leytenensis Mlldff., Nachr. '90, | C. inquieta Dohrn, viii, 273. |
| C. malbatensis Hid. | [203. |

Genus ? ALBERSIA H. Adams, 1865.

Albersia H. AD., P. Z. S., 1865, p. 410, type *H. granulata* Q. & G.—v. MARTENS, Ostasiat. Zool., Landsehn. p. 329, 1867.—TAP. CAN., Ann. Mus. Civ. Genov. xix, p. 185, 1883.—PILSBRY, Manual vii, p. 89.

Shell globose, thin; aperture but slightly oblique, the peristome hardly thickened, narrowly reflexed; columellar margin rather steeply ascending, narrowed below. Unicolored or banded, never brilliantly colored, the surface dull, granulated or hairy. Type *A. granulata*, pl. 41, fig. 30.

External anatomy and genitalia unknown.

Jaw arcuate, solid, with 6 strong ribs, denticulating the margins, and grouped on the median part of the jaw, the ends free from ribs —(pl. 34, fig. 8, *A. zonulata*). The jaw of *A. pubicepa* also is stated by von Martens to be ribbed.

Radula as in *Chloritis*, etc.; the central and inner lateral teeth having a single cusp shorter than the basal plates, the side cusps represented by slight lateral extensions of the central cusp. Outer laterals having a long, oblique cusp, which becomes bifid on the marginals (mesocone+entocone), and on the outer teeth a small ectocone appears (pl. 34, fig. 9, *A. zonulata*).

This group should perhaps be considered a subgenus of *Chloritis*, but it differs in the thin, capacious form of the shell and the Cochlostyla-like columella. No just estimate of the rank or position of the group can be made until the soft anatomy is investigated. The jaw and teeth offer no differences from those of *Chloritis*, *Thersites*, etc. Distribution, New Guinea and Moluccas.

- | | |
|--|-----------------------------------|
| <i>A. granulata</i> Q. & G., vii, 90. | <i>A. zonulata</i> Fér., vii, 91. |
| <i>A. pubicepa</i> v. Mart., vii, 90. | <i>lemniscata</i> Less. |
| <i>tortistylis</i> Mouss. | <i>v. recluziana</i> Le Guill. |
| <i>A. pseudocorasia</i> Strub., viii, 293. | <i>A. tenuis</i> Pfr., vii, 91. |

Genus THERSITES Pfr., 1855.

Thersites Pfr., 1855, plus *Hadra* Alb., 1860, plus *Badistes* Gld., 1862, plus *Sphacrospira* Mörch, 1867, plus *Xanthomelon* v. Mart., 1860, plus *Rhagada* Alb., 1860, plus *Glyptorhagada* Pils., 1890.

Shell narrowly umbilicate or imperforate, varying from globular to trochoidal or thick lens-shaped and keeled, usually solid. Whorls 5 or 6, the apex smooth, never granulated or punctate in regular quincunx; last whorl varying from smooth to rudely wrinkled, generally densely granulated or roughened microscopically, but never bearing spaced hairs or hair-sears in regular oblique series. Aperture moderately oblique, the outer lip expanded (except in *Glyptorhagada*), basal lip reflexed, dilated at the columellar insertion, the ends of the lip rather remote. Type *T. richmondiana*, pl. 29, fig. 8. (See also all figures on pl. 27).

Animal having the general features of that of *Camana*, *Chloritis*, etc.; the sole undivided and without grooves above its margin; back with one or few grooves from mantle to head; sides irregularly

tuberculate; tail with a slight median longitudinal groove above (pl. 33 figs. 6, 7. *T. gulosa* Gld.).

Jaw arcuate, stout, with 5 to 12 unequal, strong ribs (pl. 32, figs. 47, 48, 50). Teeth having the side cusps of centrals and inner laterals completely fused with the middle cusps; marginals having a long bifid inner cusp (entocone *plus* mesocone) and a simple or bifid ectocone (pl. 34, fig. 1, *T. mitchellæ*).

Genital system having no accessory organs on the female side, the duct of the spermatheca generally long and swollen below. Penis enlarged distally, where its cavity contains a solid papilla; epiphallus bearing the retractor, and terminating at the entrance of the vas deferens in a short flagellum (pl. 33, fig. 1, *Thersites richmondiana*, and figs. 2, 3, *T. mitchellæ*. Pl. 51, fig. 10, *T. solorensis*). In some species the epiphallus is shortened and the flagellum very short or absent by degeneration (pl. 32, fig. 52, *T. pachystyla*, and fig. 51, *T. rainbirdi*).

Habits strictly terrestrial. With the exception of a few New Guinea species, and some inhabiting the Timor group, the species of this genus are confined to Australia, where they are generally diffused, everywhere constituting the most prominent feature in the *Helix* fauna.

The various sections assembled under the generic term *Thersites* form a very homogeneous group, the extreme forms being well connected by a chain of intermediate species, *Xanthomelon* and *Rhagada* forming outlying or satellite groups of slightly greater systematic value than the other sections, but still intimately allied. The shell varies from thin, light forms like *corneovirens* through a series of transition species to the solid, richly dyed *blomfieldi*, *mitchellæ* and *bipartita*; and by other chains of almost unbroken continuity, the globose forms are connected with the keeled *richmondiana* and *kooringensis*. The soft anatomy fully sustains these conclusions.

The genus *Thersites* is allied to *Chloritis*, and might without any great violence be united to that genus; but it will probably prove an aid to clear and correct thinking to retain the two separate. *Thersites* never has the depressed earlier whorls, or quincuncially arranged hairs or spaced points so characteristic of *Chloritis*, and the flagellum is shorter or obsolete.

The distribution of the *Thersites* and *Chloritis* groups seems to indicate a hypothesis of two separate times of connection between Australia and the Papuan tract since the beginning of the Tertiary.

The first may have been eocene, at which time the Australian land snail fauna received the ancestors of *Thersites* (+ *Hadra*, etc.), and of *Panda*, *Pedinogyra*, etc. At this time the *Hadra* group was not differentiated from *Chloritis*. Subsequent isolation of Australia resulted in the spread of the *Hadra* group and its segregation into the modern subgenera; and during this interval the genera *Thersites* and *Chloritis* were differentiated, the one in Australia, the other in Papua. It is probable that much of the differentiation of *Planispira* and *Papuina*, which are so intimately allied to *Thersites* and *Chloritis*, occurred now, although the bases of these branches may strike still deeper. At all events, they seem to have peopled New Guinea during this interval. The second connection of Queensland with Papua was comparatively recent, although remote enough to allow specific differentiation (see Hedley in *The Nautilus*, March, 1893, p. 124), and at this time, as Hedley believes, the *Chloritis* species invaded Queensland from the north, with *Papuina*, *Atopos* and the land operculates. At the same time Queensland gave to New Guinea its few species of *Thersites* (*Sphaerospira broadbenti*, etc.), and perhaps some other forms.

THERSITES vs. HADRA. The present group as a whole has hitherto been known as *Hadra* Alb. (See v. Martens, *Die Heliceen*; Semper, *Reisen*; Hedley, *Proc. Roy. Soc. Q. and P. L. S., N. S. Wales*; Pilsbry, *Man. Conch.*), but the name *Thersites* has priority of five years over *Hadra*. It has also prior position in *Die Heliceen*, where it is diagnosed and restricted. In view of these facts, and of the further consideration that the nomenclature of Helices is now in a transition stage, we cannot refuse to follow the course indicated by established rules of nomenclature. There is another bar to the use of *Hadra* in a generic sense; it is preceded in the pages of *Die Heliceen* by *Rhagada*, and this would give the latter name priority, for there can be no doubt that both belong to one genus.

It is now obvious that the use of the name *Hadra* by German writers on shells of China and Japan is founded upon a misconception of their relationships. Part of the "*Hadra*" species of these authors belong to *Camana*, part to *Euhadra*, a group closely allied to *Campylaea*, etc.

The subdivisions of *Thersites* are not very well defined naturally, but the following may be admitted:

Subgenus **THERSITES**, in which the shell has rather a conoidal spire and is yellowish or brown, generally banded, the spermatheca

having a long duct; containing sections *Thersites*, *Glyptorhagada*, *Badistes*, *Sphaerospira*, *Hadra*.

Subgenus RHAGADA, with small, depressed globose shell, calcareous in texture and white or whitish, often multilineate; the anatomy as in the preceding.

Subgenus XANTHOMELON, with a globular shell with wide columellar lip, the spermatheca duct short.

Subgenus THERSITES Pfr.

Section *Thersites* Pfr. (restricted).

Thersites PFR. (in part), Mal. Blätter ii, p. 141 (1855 or 1856).—v. MARTENS in Alb., Die Hel. p. 157, type *H. richmondiana*.—PILSBRY, Man. Conch. vi, p. 90.—Cf. HEDLEY, Proc. Roy. Soc. Queens. v, p. 62, and vi, 1889, p. 62, pl. 3 (anatomy). Not *Thersites* Spence Bate 1857 (Amphipoda), nor Pagenstecher 1861 (Entomostraca).

Shell *lens-shaped* or *trochiform*, imperforate when adult, *carinated at the periphery*, more or less pinched at the keel, the last whorl descending in front. *Aperture sub-triangular*, oblique, the outer lip expanded, sinuous above the outer angle; basal and columellar lips reflexed. Type *T. richmondiana* Pfr., pl. 29, fig. 8.

Animal externally like *Sphaerospira*. Jaw strongly arcuate, with slightly attenuated, blunt ends, sculptured with about 11 flat ribs, broader than their interspaces, and denticulating the cutting margin (pl. 34, fig. 7, *T. richmondiana*). Radula as in *Sphaerospira*.

Genitalia (pl. 33, fig. 1, *T. richmondiana*) as in *Sphaerospira mitchellae*, etc. The penis is short and dilated distally, evidently for the accommodation of an internal papilla. Epiphallus long, bearing the retractor at its middle, terminating in a short flagellum. Duct of spermatheca very long, its lower portion large and swollen.

As will be seen by the figures, the anatomy of *Thersites richmondiana* offers no departure of more than specific value from that of *Sphaerospira mitchellae* and its allies. The group is simply a keeled form of *Hadra*, really not more different from the normal *Hadras* than *Polygyra* (*Stenotrema*) *spinosa* is from *P. stenotrema*, or than *Chlorax thersites* is from *C. sirena*. The development of a keel is now universally acknowledged to be a character of very slight systematic value in the Helices,—too slight in most cases to be held of more than specific importance. Scores of sectional groups contain both rounded and keeled species. The true relationships of *Thersites*

were perceived simultaneously and independently by Charles Hedley and the writer. Our knowledge of the anatomy is due to Hedley.

The name *Thersites* being anterior in date to *Hadra*, will replace that term as a generic designation for the entire series. The same name has been used in Crustacea and Insecta, but later than Pfeiffer's application of it to the present group.

T. richmondiana Pfr. vi, 90. Queensland, northern N. S. Wales.

f. decolorata Pils. vi, 91.

T. novæhollandiæ Gray, vi, 91. New South Wales, Australia, *depujana* Pfr.

Section *Glyptorhagada* Pilsbry, 1890.

Glyptorhagada PILS., Man. Conch. vi, p. 191 (Dec. 16, 1890).

Depressed, keeled *Badistes*, having the surface corrugated by strong oblique fold-like wrinkles, the outer lip hardly expanded; texture calcareous. Type *H. silveri*, pl. 27, fig. 19. (See also *H. kooringsensis*, pl. 27, figs. 7, 8, 9, 10).

This is the South Australian expression of the *Badistes* type; the rudely sculptured, earthy shell responding to the arid condition prevailing in the interior of South Australia, in accordance to the well known law governing the modification of desert snails. The anatomy is unknown. The species were formerly grouped in *Rhagada*, but their affinities are evidently with *Badistes*.

H. silveri Angas, vi, 191.

H. bordaensis Ang., vi, 192.

H. kooringsensis Angas, vi, 191. *H. howardi* Ang., iv, 52.

Section *Badistes* Gould, 1862.

Badistes GLD., Otia Conch. p. 243, type *H. gulosa* Gld.—PILSBRY, Man. Conch., vi, p. 94, 129.—For anatomy see HEDLEY, Rec. Austr. Mus., i, p. 196, pl. 29, 1891.

Shell generally smaller and thinner than that of *Spharospira*, the surface densely microscopically granulated all over; often with a peripheral keel. Peristome a little thickened and very narrowly expanded, suddenly dilated at the columellar insertion, closing or almost closing the narrow umbilicus. Type *T. gulosa*, pl. 27, fig. 5 (see also pl. 27, fig. 3, *T. biteniata*).

The animal has a slight groove on each side, running from lips upward and backward to mantle; back with a median furrow banded by two rugæ or sets of rugæ, on each side of which there are about six

ranks of long, narrow tubercles. The rest of the body is covered with irregular polygonal tubercles which are usually partially subdivided into minor tubercles; those on the tail being small, round and entire. There is a small triangular right mantle lappet, and apparently, a long left lappet, which emits two small lobes on the left side at the origin of the left facial (lateral) groove (pl. 33, figs. 6, 7, living animal of *T. gulosa*, after Hedley).

Jaw arched, crossed asymmetrically by 9 stout, flat-topped unequal ribs, denticulating both margins; ends smooth (pl. 33, fig. 5, *T. gulosa*).

Radula (of *T. gulosa*) having 180 rows of 39·18·1·18·39 teeth. Central and inner lateral teeth unicuspid; outer laterals oblique; marginals with a long, oblique bifid inner cusp (ento-+ meso-cone) and a small ectocone.

Genitalia (pl. 33, fig. 4, *T. gulosa*, after Hedley), having the penis twisted and swollen near its apex; retractor inserted low on the epiphallus, which bears a flagellum at the insertion of the vas deferens. Duct of the spermatheca long, inserted high on the vagina.

In soft anatomy and dentition, *Badistes* offers no variation from the type prevailing in *Sphærospira*, *Thersites* or *Chloritis*. In distribution it is more southern than *Sphærospira*, occurring mainly in New South Wales, Victoria and South Australia. The species are highly polymorphic, and have evidently been moulded by external conditions into a great number of local forms. There are more than enough specific names, the only difficulty being which and how many to discard. The reduction of species in the following list is mainly made by the advice of Messrs Cox, Hedley and Brazier. *Conf.* Brazier, Proc. Linn. Soc. N. S. Wales (2), vi, p. 321.

Gould supposed that *Helix gulosa* travelled like the caterpillar of a geometric moth, by a series of loops; but this has been shown to be an error, probably caused by some confusion in the collector's notes.

(*Group of gulosa.*)

<i>T. duralensis</i> Cox, vi, 141.	<i>T. læsa</i> Rve., iii, 214.
<i>T. daintreei</i> Braz., vi, 134.	<i>T. pliculosa</i> Pfr., iii, 216.
<i>T. patruelis</i> Ang., vi, 131.	<i>T. expeditionis</i> Cox, iii, 214.
<i>T. dunkiensis</i> Forbes, iii, 215.	<i>T. corneovirens</i> Pfr., vi, 136.
	v. <i>mulgoæ</i> Cox, vi, 136.

- T. gulosa* Gould, vi, 131.
lessoni Pfr., not auct. viii, 281.
coriaria Pfr., vi, 132.
morosa Morel., vi, 134.
monacha Pfr., vi, 133.
mastersi Cox, vi, 133.
scotti Cox, vi, 133.
? cailleti Crs., iii, 216.
T. jervisensis Q. & G., vi, 141 ; viii, 281.
gilberti Pfr., vi, 142.
grayi Pfr., vi, 130.
exocarpi Cox, vi, 139.
bednalli Braz., vi, 130.
? suttilosa Fér.
- T. greenhilli* Cox, vi, 138.
T. liverpoolensis Braz., vi, 141.
T. marcescens Cox, vi, 142.
T. (?) subgranosa Le Guill. vi, 137.
T. (?) plethorica Crse., vi, 138.
T. leucocheilus Cox, vi, 139.
marie Cox, preoc.
T. lismorensis Pils., vi, 140.
T. bellengerensis Cox, vi, 140.
T. yatalaensis Cox, vi, 140.
T. evandaleana Pfr., vi, 142.
T. tomsetti Tate, vi, 143.
T. lincolnsensis Pfr., vi, 144.
T. luteofusca Cox, vi, 144.

(Group of *biteniata*, South, Central and Western Australia).

- T. perinflata* Pfr., viii, 282.
T. biteniata Cox, vi, 144.
flindersi Ad. & Ang.
T. lorioliana Crosse, vi, 145.
T. broughami Ang., vi, 146.
T. rufofasciata Braz., vi, 146.
T. sublirioliana Pils., vi, 147.
T. cassandra Pfr., vi, 147.
T. stutchburyi Pfr., vi, 148.
- T. bourkensis* E. A. Sm., vi, 308.
T. angasiana Pfr., vi, 180.
T. nullarborica Tate, vi, 181.
T. fodinalis Tate, viii, 277.
T. everardensis Bedn., viii, 277.
T. elderi Bedn., viii, 278.
T. oscarensis Cox, viii, 279.
T. derbyi Cox, viii, 280.
T. forrestiana Ang., vi, 182.

Section *Hadra* Albers, 1860.

Hadra ALB., Die Hel. (edit. Martens), p. 165, type *H. bipartita*.
 — Cf. SEMPER, Reisen, etc., pl. 17, f. 16, dentition of *H. bipartita*.

Shell depressed with conoidal spire, narrowly umbilicated, obliquely striate or hirsute; unicolored, or brown below, yellow above, never having many bands; peristome expanded. Type *T. bipartita* Fér.

Dentition (of *T. bipartita*, pl. 32, fig. 49) similar to that of *Sphærospira*, etc.; the central and lateral teeth unicuspid, marginals with an ectocone. The figure shows a central with one adjacent lateral tooth, and the 47th side tooth.

Hadra, as restricted, consists of a few north Queensland species, differing somewhat from *Sphærospira* in shell characters.

shaped, the walls of its cavity granulated, having a large solid, granulated papilla at the apex, near the entrance of the epiphallus (pl. 33, fig. 3, papilla indicated by dotted line). Epiphallus long, the penis retractor inserted at the proximal third of its length; ending in a flagellum. Penis retractor short, attached to floor of the lung cavity. Right eye-peduncle retracted between primary branches of genitalia. Pl. 33, figs. 2, 3, *H. mitchellæ*; fig. 2, reverse view of vagina, showing lower course of uterus and vas deferens. (From a specimen received from Dr. Cox).

T. mitchellæ and *broadbenti* have the type of genitalia described above, but in the latter the spermatheca has a shorter stalk. A second type of genitalia is found in *T. basalis* (=rainbirdi), *T. fraseri*, *T. blomfieldi* in which species the epiphallus is extremely short and the flagellum either extremely short or obsolete, evidently by degeneration. Only by opening the penis can the true condition of these organs be ascertained. (See pl. 32, fig. 51, *T. rainbirdi*, after Hedley).

In anatomy, *Sphaerospira* agrees with *Badistes* and *Thersites*, except that in some species the appendages of the penis have undergone degeneration resulting in secondary haplogonism. The group inhabits Queensland with a few forms in New Guinea, being replaced southward by *Badistes*, westward by *Xanthomelon*.

Most of the species of *Sphaerospira* live under the loose bark of fallen trees and on the ground, and are gregarious. Some occur under stones in damp places. *No Hadras are arboreal*, according to Hedley; differing totally in this respect from *Papuina*, but agreeing with *Chloritis*.

(*Imperforate species*).

<i>T. fraseri</i> Gray, vi, 150.	<i>T. croftoni</i> Cox, vi, 153.
v. <i>flavescens</i> Hedl., vi, 151.	<i>T. blomfieldi</i> Cox, vi, 154.
<i>T. coarctata</i> Fér., vi, 151.	v. <i>warroensis</i> Hedl. & Mouss.,
<i>T. zebina</i> Braz., vi, 151.	[viii, 281.
<i>T. mossmani</i> Braz., vi, 152.	<i>T. mitchellæ</i> Cox, vi, 154.
<i>T. coxi</i> Crosse, vi, 152.	<i>T. gratiosa</i> Cox., vi, 155.
<i>forbesi</i> Cox, preoc.	<i>T. etheridgei</i> Braz., vi, 156.
<i>cerea</i> Cox, preoc.	<i>T. macleayi</i> Cox, vi, 156.
<i>cerata</i> Cox.	<i>T. andersoni</i> Cox, vi, 157.

(*Umbilicated species*).

<i>T. rainbirdi</i> Cox, vi, 157.	<i>T. rawnesleyi</i> Cox, viii, 282.
<i>basalis</i> Mouss.	<i>T. barneyi</i> Cox, vi, 165.

- T. oconnellensis* Cox, vi, 158.
 albofilata Mouss.
T. arthuriana Cox, vi, 159.
T. rockhamptonensis Cox., vi,
 planibasis Cox, ms. [159.
 v. *moresbyi* Ang., vi, 160.
 v. *pallida* Hedl. & Mss. viii, 281.
T. informis Mouss., viii, 282.
T. palmensis Braz., vi, 160.
 v. *meridionalis* Braz., vi, 161.
T. bellendenkerensis Braz., vi,
 [161.
T. parsoni Cox, vi, 162.
T. appendiculata Pfr., vi, 163.
T. seminigra Morel., vi, 162.
 lessoni Pfr., olim., et auct.
 ? = *incei* var.
T. incei Pfr., vi, 166.
 v. *aureedensis* Braz., viii, 282.
 v. *bayensis* Braz., vi, 166; viii,
 [282.
T. thatcheri Cox, vi, 164.
T. hilli Brazier, vi, 164.
T. mazee Braz., vi, 165.
T. hanni Braz., vi, 166.
T. prætermisii Cox, vi, 167.
T. mulgravensis Braz., vi, 168.
 mulgravei Braz.
T. curtisiana Pfr., vi, 168.
 balu Braz., vi, 169.
T. johnstonei Braz., vi, 170.
T. creedi Cox, vi, 170.
T. wesselensis Cox, vi, 170.
T. sardalabiata Cox, vi, 171.
 stephensoniana Braz.
T. whartoni Cox, vi, 171.
T. mourilyana Braz., vi, 172.
T. yulei Forbes, vi, 172.
T. challisi Cox, vi, 173.
T. nicomede Braz., vi, 173.
T. beddomæ Braz., vi, 174.
T. bebias Braz., vi, 175.
T. cookensis Braz., vi, 175.
T. tomsoni Braz., vi, 175.
T. broadbenti Braz., vi, 176.
T. hixonii Braz., vi, 177.

Subgenus *XANTHOMELON* v. Martens, 1860.

Xanthomelon Mrs., in Alb., Die Hel., p. 174, type *H. pomum*; Mal. Blätter xvi, p. 77, 1869.—PILS., Man. Conch., vi, p. 178.—For anatomy, see SEMPER, Reisen, p. 160, pl. 14, and HEDLEY, P. R. S. Q., vi, p. 250, pl. 14, and p. 121, pl. 8.

Shell large, solid and *globular*, the spire small, body-whorl large, globose, descending to the aperture, which is semioval and somewhat oblique. Peristome narrowly expanded, thickened within; columellar lip broad, flattened, partly or wholly covering the axial perforation; surface somewhat roughened, covered with a yellow cuticle. Type *T. pomum*, pl. 27, fig. 6.

Jaw stout, arched, with 8 (*perinflata*) to a dozen (*pachystyla*) stout ribs, obsolete toward the ends (pl. 32, fig. 47, *pachystyla*).

Radula as in *Sphaerospira* etc. (pl. 32, fig. 46, *pachystyla*).

Genital system having the penis rather short and stout, twisted at its apex, where the retractor-muscle and vas deferens are apparently

inserted. Spermatheca duct short and arising high on the vagina (pl. 32, fig. 52, *pachystyla*).

The shell is more globular than that of *Hadra s. str.* or *Sphaerospira*, with smaller spire and wider columellar lip. The jaw and teeth are not different from those of *Sphaerospira*, etc. The peculiarity of the genital system is the apparent obsolescence of the epiphallus and flagellum, and the shortness of the duct of the spermatheca, which is, as a general rule, long in this genus and its allies. Semper has investigated the anatomy of *pachystyla*, and Hedley that of *pachystyla* and *periuflata*. The penis should be re-examined, with a view to finding traces of the missing epiphallus and flagellum, and the internal papilla.

The species inhabit Queensland, Arnhem land and the adjacent parts of the northern territory of S. Australia. *T. pachystyla* is found on sandy ridges buried a few inches below the surface among the roots of bushes, in dry weather.

T. pomum Pfr., vi, 178.

urvillei H. & J.

pseudomeadei Braz.

? *spheroidea* Le Guill.

T. nigrilabris v. Mts., vi, 179.

edwardsi Cox not Bld.

meadei Braz.

T. banneri MacGill. vi, 179.

T. lyndi Angas, vi, 183.

T. pachystyla Pfr. vi, 184.

v. *daemeli* v. Mts. vi, 184.

T. jannellei Le Guill, vi, 182.

pachystyloides Cox.

Subgenus RHAGADA Albers, 1860.

Rhagada ALB., Die Hel., 1860, p. 108, type *H. reinga* Gray. PILSBRY, Man. Conch., vi, p. 184.—WIEGMANN, Weber's Zool. Ergebnisse einer Reise in Niederl. Ost-Ind. iii, p. 169 (anatomy).

Shell small, compact, globose-depressed, narrowly or covered umbilicated, rather solid and cretaceous, whitish, unicolored or multi-lineate with reddish, the supraperipheral band most prominent and constant; periphery rounded; outer lip more or less expanded and thickened, columella reflexed, partly or wholly closing the umbilicus. Type *T. reinga* Gray. (see pl. 27, figs. 16, 17, 18, *T. carcharias* Pfr. Pl. 27, figs. 11, 12, 13, *T. supracostulata* Schepm. Pl. 27, figs. 14, 15, *T. floresiana* Martens).

Jaw (pl. 51, figs. 7, 8, *T. solorensis*) arcuate, with 4 or 5 unequal and asymmetrically arranged strong ribs.

Radula (pl. 51, figs. 11, 12, *T. solorensis*) with 126–163 transverse rows of 31. 1. 31 to 38. 1. 38 teeth of the type usual in *Chloritis* and

Hadra. Central and inner lateral teeth having the ecto- and entocones completely fused with the mesocones, which attain or project beyond the posterior edges of the basal-plates. Outer laterals have side cusps developed, the meso- and entocones forming a long compound cusp as in *Chloritis*, etc. Marginal teeth (fig. 11) tricuspid, or having the ectocones bifid (figs. 11, 12 show central with two adjacent laterals, 10th to 13th lateral and transition teeth, 22d, 23d and 32d to 35th marginal teeth; after Wiegmann. Pl. 51, fig. 9, shows a central and lateral tooth from another individual, in which the ectocones are developed). In *T. convicta* the jaw has 7 stout ribs, dentition as in *solorensis* (See Binney, Dent. Pulm. Moll. pl. x, f. G.)

Genitalia (pl. 51, fig. 10, *T. solorensis*, after a drawing by Mr. A. Protz) with a short flagellum on the penis, the spermatheca-duct inserted high on the vagina. No penis retractor is shown in the sketch, but it is probably present; and it is likewise probable that the penis proper terminates with the swollen portion seen at about the middle of its length, and that it contains a papilla there; the narrower upper part, as far as the entrance of the vas deferens, being an epiphallus.

The snails of this section have a smaller, more compact and cretaceous shell than *Hadra*, with a different scheme of color. The anatomy offers no deviation of any importance from that of *Hadra* and *Chloritis*.

(*Species of N. Australian coast and adjacent islands*).

- | | |
|--|-------------------------------------|
| <i>T. reinga</i> Gray, vi, 185. | <i>T. convicta</i> Cox, vi, 187. |
| <i>T. richardsonii</i> E. A. Sm., vi, 185. | <i>T. plectilis</i> Bens., vi, 188. |
| <i>T. leptogramma</i> Pfr., vi, 186. | <i>paleata</i> Rve. |
| <i>T. dringi</i> Pfr., vi, 186. | <i>T. carcharias</i> Pfr., vi, 189. |
| <i>T. tescorum</i> Bens., vi, 187. | <i>T. (?) torulus</i> Fér. vi, 189. |
| <i>T. elachystoma</i> v. Mts., vi, 187. | |

(*Species of Solor, Flores, and other islands N. of Timor Sea*).

- | | |
|--|--|
| <i>T. colona</i> v. Mts., vi, 190. | <i>T. floresiana</i> v. Mts., pl. 27, f. 14, 15. |
| <i>T. solorensis</i> v. Mts., vi, 190. | <i>T. supracostulata</i> Schep., viii, 283. |

Genus PAPUINA von Martens, 1860.

Papuina Mts., Die Hel. (2d edit.), p. 166, type *H. liturus* Less.—PILSBRY, Man. Conch., (2), vii, p. 3.—*Eugenia* ALB. Mss.—*Insu-*

laria TAP. CAN. Ann. Mus. Civ. Genov. xix, p. 115, 138, type *H. lituus*, 1883. *Pileolus* LESSON, Voy. de la Coquille. Zool. ii, p. 313 (preoc.).—*Cymotropis* v. Mart., Die Hel., p. 169, type *H. "vitrea" = antrorsa*.—*Merope* ALB., Die Hel., 2d edit., p. 158, type *H. fringilla* (preoc.).—*Geotrochus* of BECK and authors, not of v. Hasselt.—*Acavus* SMITH and TAP. CAN., not of Montf.

Shell turbinate, lens-shaped or trochiform, umbilicated or imperforate, rather thin; periphery varying from round to acutely keeled. Surface smoothish, the coloring light or bright. Aperture oblique, toothless or with a columellar nodule, the peristome thin and generally expanded, ends of the lip remote. Type *P. lituus* Less. pl. 29, fig. 12 (see also pl. 29, figs. 14, 15, *P. trobriandensis*. Fig. 11, *P. splendescens*. Fig. 13, *P. nortoni*. Pl. 46, figs. 17–19, *P. iunthe*).

Animal with the foot rather short, sole undivided; upper surface densely granulated, with a slight median longitudinal groove above, the tail densely granulose with no median groove. Mantle with a triangular right lappet and an elongated low left one, the latter emitting a lobe on the left side.

Jaw thin and weak, arcuate, its median portion ribbed, ends blunt and ribless. (Pl. 34, fig. 11, *P. moseleyi*. Pl. 34, fig. 12, *P. vexillaris*. Pl. 37, fig. 2, *P. conscendens*. Pl. 13, fig. 17, *P. grata*. Pl. 13, fig. 18, *P. taumantias*. Pl. 13, fig. 25, *P. louisianensis*. Pl. 13, fig. 24, *P. boyeri*. Pl. 13, fig. 26, *P. bruneriensis*. Pl. 13, fig. 28, *P. macgillivrayi*).

Radula of two types. Typically, the transverse rows are nearly straight; the central and lateral teeth with wide, blunt mesocones, shorter than the basal plates, the marginals with three short, wide cusps (pl. 13, fig. 23, *boyeri*. Pl. 13, fig. 29, *fringilla*. Pl. 37, fig. 11, *conscendens*). In *P. moseleyi* (pl. 37, fig. 1) the cusps are very broad, and project beyond the basal plates.

In some divergent species the transverse rows of teeth are v-shaped; central teeth (pl. 37, fig. 9), with an extremely broad, gouge-like cusp (united meso- and ectocones), the laterals having the cusp partially divided into entocone and mesocone, an ectocone appearing on the outer laterals and marginals. The teeth are all of the same general form, and in all the cusps project over the basal plates. This type of teeth occurs in *P. boivini* and in *vexillaris* (pl. 37, figs. 9, 10), and will probably prove characteristic of the groups those species belong to, and also of the *P. meta* group; the other groups having the more normal type of teeth. This aberrant type is com-

parable to that of *Polymita* and *Oxychona*, and seems to be correlated with arboreal habits. *P. moseleyi* bridges, to some extent, the gap between the two types of teeth.

Genital system having no accessory organs on the female side, the spermatheca on a rather long duct. Penis containing a papilla at its apex, continued in a long epiphallus which bears the retractor, and which passes into the vas deferens, having no flagellum or merely the rudiment of one. (Pl. 37, fig. 5, *P. trobriandensis*; pl. 37, figs. 3, 4, *P. vexillaris*; pl. 37, figs. 7, 8, *P. fringilla*; pl. 13, fig. 16, *P. grata*; pl. 13, fig. 21, *P. yulensis*; pl. 13, fig. 27, *P. brumeriensis*).

In another series of species the penis is short, the epiphallus very short, hardly distinguishable, ending in a short flagellum (pl. 13, fig. 22, *P. taumantias*; pl. 37, fig. 6, *P. brazieri*). Some of these have the spermatheca duct very short.

The prominent features of the anatomy are the weakness of the thin jaw, the breadth of the cusps of the teeth, and the lack of a flagellum upon the epiphallus, or its shortness, the union of epiphallus and vas deferens being indicated only by a slight protuberance at the end of the former, in most species.

In some species (*trobriandensis*, *woodlarkiana*, *moseleyi*) the penis is extremely small. In others (*boyeri*, *louisianensis*, *fringilla*) it is large and muscular. In one group of forms, *taumantias*, *brazieræ*, *tomasinelliana*, *gestroi*, *meditata*, *ridibunda*, the epiphallus is reduced to a very short extent, or even obsolete, and a short flagellum is developed. There is, therefore, a wide range of variation in the soft parts, as in the shells, of this genus.

In *P. fringilla* the papilla is extremely long, and the walls of the penis cavity are transversely corrugated (pl. 37, fig. 7). In *P. vexillaris* the papilla is large but short (pl. 37, fig. 4). The eye-stalk is retracted between the branches of the genitalia, as usual. In *P. fringilla* the left edge of the mantle bears a lobe, at the position where two lobes are shown in *Thersites* (*Badistes*) *gulosa*.

The anatomy of many forms is now known: Binney has figured the teeth of *P. fringilla* (Ann. N. Y. Acad. III, p. 113). Tapparone Canefri has figured the genitalia of *P. yulensis*, *katauensis*, *taumantias*, *ridibunda*, *meditata*, *grata*, *novoguineensis*, *brazieræ*, *gestroi*, *tomasinelliana* (Ann. Mus. Civ. Genov. xix, pl. 6 and 7). Hedley has illustrated the anatomy of *P. brumeriensis*, *louisianensis*, *rollsi-ana*, *woodlarkiana*, *trobriandensis*, and *boyeri* (Proc. Linn. Soc. N. S. Wales (2), vi, pl. 38-42). Pfeffer has figured the anatomy of *P.*

boivini (Monatsber. Berl. Akad. Wissensch. 1877, p. 277, pl. 2, f. 11-13). The writer has examined the soft parts of *P. fringilla*, *rexilaris*, *moseleyi* and *conscendens*.

Papuina is an exclusively arboreal genus, being strongly contrasted in this habit to its allies *Thersites* and *Chloritis*. The shell is of lighter structure and brighter color than in these terrestrial groups, somewhat approaching that of *Cochlostyla*—a case of convergence of external characters from similar habits. The teeth differ from those of allied groups, *Thersites*, *Chloritis*, *Planispira*, in the great breadth and bluntness of the cusps, a structure correlated with arboreal habits. The jaw is more delicate than in the allied genera.

The great variation observed in the genitalia and teeth of the species examined, shows that here lies a wide field for future cultivation. These features are no doubt characteristic of minor groups in the genus, and their investigation will lead to valuable results in the classification of the group, and secondarily may be of use in the study of its geographical distribution and migrations. The arboreal habit has evidently been long established, for otherwise we should not have so profound a remodeling of the dentition.

The geographic limits of the genus are on the northwest Halmahera, on the southeast, the New Hebrides group. There are two principal centers of specific radiation: New Guinea and the Solomon archipelago. The former of these has peopled the Moluccas, Queensland and the Louisiades. The species of Java, Sumatra and India referred by authors to this genus belong to other groups, mainly *Satsuma*.

Subdivisions.

Section *Papuina*. Shell having the outer lip well expanded, baso-columellar lip reflexed.

Section *Dendrotrochus*. Shell trochoid, the columellar lip not in the least expanded or reflexed.

Section *Papuina* (restricted).

(Group of *P. boivini*; Solomon and New Britain groups.)

P. congrua Pfr., vii, 4.

P. hargreavesi Ang. vii, 9.

P. chancei Cox, vii, 5.

hargreavesi auct.

amphizona Pils., vii, 5.

P. gamelia Ang., vii, 10.

- | | |
|----------------------------------|---------------------------------------|
| P. boivini Petit, vii, 6. | P. brodiei Braz., vii, 10. |
| <i>subrepta</i> H. & J. | P. dampieri Ang., vii, 11. |
| <i>colorata</i> Mss. | P. walleri Braz., vii, 12. |
| P. ambrosia Ang., vii, 7. | <i>brenchleyi</i> Ang., not Braz. |
| <i>ramsdeni</i> Ang. | P. alfredi Cox, vii, 12. |
| P. malantensis Ang., vii, 7. | v. <i>trichroa</i> v. Mart., vii, 12. |
| P. philomela Ang., vii, 8. | P. macfarlanei Cox, vii, 13. |
| P. guadalcanarensis Cox, vii, 9. | P. coxiana Ang., vii, 13. |

(Group of *P. meta*; Solomon Is.).

- | | |
|-----------------------------------|-------------------------------|
| P. xanthochila Pfr., vii, 15. | P. plagiostoma Pfr., vii, 19. |
| P. miser Cox, vii, 20. | P. guppyi Smith, vii, 19. |
| <i>beatrix</i> Ang., vii, 15. | P. adonis Angas, vii, 20. |
| P. choiseulensis Braz., vii, 16. | <i>metula</i> Crosse. |
| P. spendescens Cox, vii, 16. | P. blanda Cox, vii, 21. |
| <i>brenchleyi</i> Braz., vii, 16. | P. mendoza Braz., vii, 21. |
| <i>mendana</i> Ang., vii, 17. | P. hermione Ang., vii, 21. |
| P. meta Pfr., vii, 17. | <i>biocheana</i> Crosse. |
| <i>deidamia</i> Ang. | P. migratoria Pfr. vii, 22. |
| v. <i>acmella</i> Pfr., vii, 18. | <i>leucophæa</i> Cox. |

(Group of *P. flexilabris*; Solomons, Louisiades and New Ireland).

- | | |
|------------------------------|------------------------------------|
| P. vexillaris Pfr., vii, 46. | P. lambei Pfr., vii, 48. |
| <i>phthisica</i> Pfr. | <i>lombei</i> Pfr., <i>olim</i> . |
| P. boyeri C. & F., vii, 47. | P. flexilabris Pfr., vii, 49. |
| P. phæostoma Mart., vii, 47. | P. coniformis Fér., vii, 50. |
| P. gaberti Less., vii, 48. | <i>turbinata</i> Desh. |
| <i>trochus</i> Q. & G. | v. <i>tuffetii</i> Less., vii, 51. |
| <i>trochoides</i> Desh. | P. sellersi Cox, vii, 51. |

(Group of *P. conscendens*; Queensland).

"A small group of Queensland snails seem to differ from the main body of the genus in their habits. Not the stem or branches, but the *leaves* of trees are chosen by these for their favorite abode. To suit the situation the shell has been modified until the contour would suggest *Partula* rather than *Papuina*. The more conical shape has probably been adopted for greater safety in the exposed tree tops; to the same end every superfluous atom of weight has

been abandoned, the shell reduced to the thinnest, and the reflected lip dispensed with." (*Hedley, Nautilus*, vii, p. 73).

P. fucata Pfr., vii, 14.

P. folicola Hedley, *Nautilus*, l. c.

P. conscendens Cox, vii, 14.

B. bidwilli Cox not Pfr.

(Group of *P. pileus*; Moluccas and New Guinea).

P. euchroes Pfr., vii, 23.

P. lenta Pfr., vii, 23.

P. pileus Müll., vii, 24.

P. canovarii Tap. Can., vii, 26.

pileata, *bifasciata*, *ambigua*

P. blanfordiana H. Ad., vii, 26.

[Gmel.

blanfordi H. Ad.

P. blainvillei Le Guill, vii, 25.

turbinata Val., *ms.*

gärtneriana Pfr.

v. *poirieri* Tap. Can., vii, 27.

zoue Pfr.

(Group of *P. poiretiana*; Night I., N. E. Australia).

P. poiretiana Pfr., vii, 27.

(Group of *P. antiqua*; Borneo?, New Guinea).

P. antiqua Ad. & Rv., vii, 28.

P. leonardi Tap. Can., vii, 32.

P. xanthosoma Pils., vii, 28.

horderi Sowb., vii, 29.

(Group of *P. pileolus*; Moluccas and western New Guinea).

P. pileolus Fér., vii, 29.

P. exsultans Tap. Can., vii, 31.

f. *turrita* v. Mart.

ferussaci Pfr., Novit. Conch.

f. *pyramidata* v. Mart.

P. hedleyi Smith, viii, 290.

f. *convexa* v. Mart.

P. pythonissa Tap. Can., vii, 31.

f. *depressa* v. Mart.

P. turris H. Ad., vii, 32.

P. rhynchostoma Pfr., vii, 30.

P. fergusoni H. Ad., vii, 32.

P. ferussaci Less., vii, 30.

P. steursiana Shutt., vii, 33.

(Group of *P. vitrea*: Moluccas and New Guinea).

P. vitrea Fér., vii, 33.

P. ianthe Smith, vii, 58.

f. *albula* Le Guill.

P. nodifera Pfr., vii, 37.

vitracea Beck.

P. pelechystoma Tap. Can., vii, 35

P. arrowensis Le Guill, vii, 34.

P. pennantiana Pfr., vii, 36.

P. chondrodes Strub., viii, 292.

P. carinata Hombr. & Jacq., vii, 36.

P. lanceolata Pfr., vii, 34.

P. bevani Braz., viii, 292.

P. grata Mich., vii, 35.

P. ? elisus Hedl., viii, p. 292.

acuta Q. & G., not Lam.

P. ? goldiei Braz., vi, 217.

P. leucotropis Pfr., vii, 36.

oxystoma Smith (preoc.).

P. hero Smith, vii, 57.

P. ? tritonensis Le Guill., vii, 88.

(Group of *P. labium* : Papuan region).

- | | |
|--|---|
| <i>P. lituus</i> Less., vii, 37. | <i>P. aurora</i> Pfr., vii, 41. |
| <i>ardouini</i> Dh. | <i>P. ærope</i> Smith., vii, 41. |
| <i>papuensis</i> Q. & G. | <i>P. novoguineensis</i> Pfr. vii, 42. |
| <i>P. labium</i> Fér., vii, 38. | v. <i>triumphalis</i> Rve, vii, 42. |
| <i>P. pseudolabium</i> Pfr., vii, 38. | v. <i>mysolensis</i> Pfr., vii, 43. |
| <i>P. multizona</i> Less., vii, 39. | <i>P. waighouensis</i> H. Ad., vii, 43. |
| <i>tenniradiata</i> Q. & G. | <i>P. brazieræ</i> Braz., vii, 43. |
| <i>multizonata</i> Desh. | v. <i>lacteolota</i> Smith, vii, 25. |
| <i>spectrum</i> Rve. | <i>P. tomasinelliana</i> T. C. vii, 44. |
| <i>P. taumantias</i> Tap. Can., vii, 39. | v. <i>anozonata</i> Hedl., viii, 288. |
| v. <i>cingulata</i> Hedl., viii, 288. | v. <i>agnocheilus</i> Smith, viii, 289. |
| <i>P. ridibunda</i> Tap. Can., vii, 40. | <i>P. gestroi</i> Tap. Can., vii, 44. |
| <i>P. sicula</i> Braz., vii, 45. | <i>P. maclayana</i> Braz., vii, 45. |
| <i>meditata</i> Tap. Can., vii, 40. | |

(Group of *P. lousiadensis* : Louisiades, d'Entrecasteaux Is., and British New Guinea).

- | | |
|--|--|
| <i>P. tayloriana</i> Ad. & Rv., vii, 58. | <i>P. lousiadensis</i> Forbes, vii, 61. |
| <i>yulensis</i> Braz. | v. <i>millicentæ</i> Cox, vii, 62. |
| <i>P. strabo</i> Braz., vii, 60. | v. <i>thomsoni</i> Smith, vii, 62. |
| <i>roseolabiata</i> Smith. | <i>P. gurgustii</i> Cox, vii, 61. |
| <i>kutaensis</i> T. C. | <i>P. rhombostoma</i> Pfr., vii, 60. |
| <i>P. gorenduensis</i> Braz., vii, 63. | <i>P. woodlarkiana</i> Souv., vii, 62. |
| <i>P. rollsiana</i> Smith, vii, 63. | <i>P. trobriandensis</i> Hedl., viii, 290. |
| <i>P. comriei</i> Ang., vii, 64. | <i>P. albocarinata</i> Smith, vii, 59. |

(Group of *P. brumeriensis* : Eastern New Guinea).

- | | |
|---|--|
| <i>P. chapmani</i> Cox, vii, 51. | <i>P. zeno</i> Braz., vii, 53. |
| <i>coraliolabris</i> Smith, | <i>latiavis</i> Smith. |
| <i>P. brumeriensis</i> Forbes, vii, 52. | <i>P. diomedes</i> Bras., vii, 54. |
| v. <i>albolabris</i> Hedl., viii, 289. | <i>P. naso</i> v. Mart., vii, 56. |
| <i>P. rangii</i> Less., vii, 53. | <i>tapparonei</i> Smith. |
| <i>extricanda</i> Tap. Can. | <i>P. rhynchonella</i> Tap. Can., vii, 57. |

(Australian Species).

- | | |
|--|-------------------------------------|
| <i>P. macgillivrayi</i> Forbes, vii, 55. | <i>P. bidwilli</i> , Pfr., vii, 55. |
| <i>P. cerea</i> Hedl. | <i>bridwilli</i> Pfr., olim. |

(Group of *P. eddystonensis*).

- | | |
|---|--------------------------------------|
| <i>P. eddystonensis</i> Reeve, vii, 64. | <i>P. nortoni</i> Braz. |
| <i>P. motacilla</i> Pfr., vii, 66. | <i>P. cærulescens</i> Ang., vii, 68. |

- | | |
|--------------------------------------|--|
| <i>P. gelata</i> Cox, vii, 65. | <i>P. pudica</i> Pfr., vii, 69. |
| <i>v. maddocksi</i> Braz., vii, 66. | <i>P. lienardiana</i> Crosse, vii, 69. |
| <i>P. antrorsa</i> Pfr., vii, 67. | <i>P. eros</i> Angas, vii, 70. |
| <i>vitrea v. Mart.</i> , olim. | <i>P. redempta</i> Cox, vii, 70. |
| <i>P. sachalensis</i> Pfr., vii, 67. | <i>P. nigrofasciata</i> Pfr., vii, 71. |
| <i>P. leucothoe</i> Pfr., vii, 68. | <i>P. donnaisabellæ</i> Ang., vii, 71. |

(Group of *P. moseleyi*).

- | | |
|------------------------------------|---|
| <i>P. moseleyi</i> Smith, vii, 72. | <i>P. novægeorgiensis</i> Cox, vii, 72. |
|------------------------------------|---|

(Group of *P. fringilla*).

- | | |
|------------------------------------|-------------------------------------|
| <i>P. fringilla</i> Pfr., vii, 73. | <i>P. barnaclei</i> Smith, vii, 73. |
|------------------------------------|-------------------------------------|

Section DENDROTRUCHUS Pilsbry, 1894.

Papuina with the shell imperforate, trochiform, with rhombic aperture, the lip thickened within; *columellar lip not expanded or reflexed*. Type *P. helicinoides* Hombr. & Jacq.

Soft anatomy unknown. Distribution Solomon Is., New Hebrides, Admiralty Is. and New Ireland. They are arboreal in habit. Brazier found *P. cyrene* in hundreds on the under sides of leaves of small bushes, in Ugi, Solomon Is.

This is quite a well characterized section of *Papuina*. According to Hedley the Solomon Islands forms (*cleryi*, *quirosi*, *zelina*, *cyrene*) will prove to be varieties of one species (see Man. Conch., viii, p. 290).

- | | |
|--|---------------------------------------|
| <i>P. labillardierei</i> Smith, vii, 75. | <i>P. cineracea</i> H. & J., vii, 77. |
| <i>P. helicinoides</i> H. & J., vii, 76. | <i>cineracea</i> Rouss. |
| <i>v. cleryi</i> Recl., vii, 76. | <i>P. cyrene</i> Crosse, vii, 78. |
| <i>septentrionalis</i> Sm. | <i>P. eva</i> Pfr., vii, 78. |
| <i>v. meridionalis</i> Sm., vii, 77. | <i>P. layardi</i> Hartm., vii, 79. |
| <i>v. quirosi</i> Cox, vii, 80. | <i>P. pyxis</i> Hinds, vii, 80. |
| <i>P. zelina</i> Cox, vii, 78. | <i>P. crucibulum</i> Pfr., vii, 81. |

Genus PLECTOPYLIS Benson, 1860.

Plectopylis BENS., Ann. and Mag. N. H. (3), v, p. 243.—STOLICZKA, Journ. Asiat. Soc. Beng. xl, (2), p. 217, pl. 15 (anatomy).—GODWIN-AUSTEN, P. Z. S. 1874, p. 608.

Shell depressed, with flat or low-conical spire and large umbilicus, dextral or sinistral; solid or thin, the upper surface generally sculpt-

ured with spiral lines, hirsute in the young. Aperture half-round or lunate, oblique, the lip reflexed, its ends generally joined by an elevated parietal callus, which usually bears an entering lamella. Interior of the last whorl *obstructed by a barrier composed of a transverse plate or plates on the parietal wall*, and several transverse or longitudinal denticles or plates on the outer wall. Type *P. achatina* Gray, pl. 40, figs. 5, 6, 7, 8. (See also pl. 40, figs. 1-4, *P. jovia*. Pl. 40, figs. 9-12, *P. ponsonbyi*. Pl. 40, figs. 13-15, *P. fultoni*).

Foot short, rarely equalling in length the diameter of the shell; tentacles very short; eye pedicles of moderate length. Mantle edge thin, with small right and left body-lappets. Pulmonary cavity small. Kidney large, triangular.

Jaw very thin, horny, arched, with a small anterior median projection; it is marked transversely with a great number of more or less distant grooves which divaricate in the center (pl. 42, fig. 36. *P. cyclaspis*). Radula of moderate width, long, composed of about 100 transverse more or less V-shaped rows of 60-70 teeth. *Central tooth smaller, sometimes much smaller, than the laterals*, very narrow, the reflection small, with three slender cusps. Lateral teeth with a large inner cusp and simple or bifid outer cusp, and a minute inner cusp (pl. 42, fig. 35, *P. cyclaspis* central, 1st, 2d and 12th laterals, and 20th and 25th marginal teeth. In *P. pinacis* the central tooth is larger and more similar to the laterals.

Genital system (pl. 42, fig. 34, *P. cyclaspis*) having the duct of the spermatheca long. An organ of unknown homology (either a dart sack, a diverticulum of the spermatheca, or an appendicula) enters the vagina just above the opening of the spermatheca duct. Uterus containing few large eggs. Penis simple, receiving the vas deferens and the penis retractor at its apex, the latter attached distally to the floor of the lung cavity.

This group differs from *Corilla* in having perpendicular internal lamellæ upon the parietal wall of the shell. It is different from *Corilla* and all other Helices in the converging V like elements of the thin jaw, which is quite of the goniognathous type found in *Cylindrella*, *Orthalicus* and *Otostomus*. The small size of the central teeth is also an anomalous feature, recalling the *Achatinidæ*. Perhaps the accessory organ of the vagina (seen between the uterus and the spermatheca in pl. 42, fig. 34) is really a diverticulum of the spermatheca duct; and if this is the case the genital organs will not differ very much from those of *Corilla*, although in that genus the

retractor of the penis is attached to the uterus wall (as in *Hyalosagda*) instead of to the lung floor.

The apex of the shell is rather large, as in *Corilla*, and usually somewhat rugose. The grouping of the species is based upon the form of the internal barrier, which is sometimes simple (pl. 40, fig. 4), sometimes excessively complex by the duplication of the parietal and palatal barrier (pl. 40, figs. 7, 8, 12). Godwin-Austen found shells with insects fixed between the teeth, so that there can be little doubt that this barrier has been evolved for the protection of the snail from predatory insects which swarm in the regions these forms inhabit.

P. achatina and *cyclaspis* are found on limestone hills, the animal being shy, usually living in crevices and holes, and closely adhering to the rock, even when moving about.

This genus inhabits India and Farther India, extending north to central China and south to Ceylon and the Philippine Islands.

Subdivisions.

Plectopylis is herein expanded to contain two Chinese groups of uncertain affinities, besides the typical group.

Subgenus PLECTOPYLIS. Whorls regular, the last not distorted nor grooved outside; having internal transverse barriers within the last whorl.

Subgenus TRAUMATOPHORA. Latter part of last whorl contracted outside; throat obstructed by entering palatal lamellæ, but having no internal processes on the parietal wall.

Subgenus STEGODERA. Shell sinistral, the last whorl distorted straightened, embracing the preceding; aperture crescentic, toothless; throat very narrow, but without internal teeth or lamellæ.

Subgenus PLECTOPYLIS Bens.

(*Parietal vertical lamina double or compound*).

- | | |
|--|--|
| <i>P. achatina</i> Gray, iii, 165. | <i>P. refuga</i> Gld., iii, 164. |
| ? <i>repercussa</i> Gld. | <i>P. dextrorsa</i> G.-Aust., iii, 164. |
| <i>P. anguina</i> Gld., iii, 165. | <i>P. leiophis</i> Bens., iii, 163. |
| <i>P. brahma</i> G.-Aust. iii, 164. | <i>P. shiroensis</i> G.-Aust., iii, 163. |
| <i>P. cyclaspis</i> Bens., iii, 164. | <i>P. feddeni</i> Blanf., iii, 163. |
| <i>catinus</i> Bens. olim. | <i>P. brachyplecta</i> Bens., iii, 163. |
| <i>P. karenorum</i> Blanf., iii, 164. | <i>P. biforis</i> Hde., iii, 166. |
| <i>P. revoluta</i> Pfr., Mon., v, 416. | <i>P. ponsonbyi</i> G. A. |

(*Parietal vertical lamina single*).

- | | |
|-------------------------------------|-------------------------------------|
| P. shanensis Stol., iii, 162. | P. brachydiscus G.-Aust., iii, 162. |
| <i>trilamellaris</i> G.-A. | P. pseudophis W. Blanf., iii, 162. |
| P. perarcta Blanf., iii, 162. | P. nagensis G.-Aust., iii, 161. |
| P. retifera Pfr., iii, 161. | P. andersoni W. Blf., iii, 161. |
| P. clathratula Pfr., iii, 161. | P. plectostoma Bens., iii, 160. |
| <i>puteolus</i> Bens. | <i>prodigium</i> Bens. <i>mss.</i> |
| P. fultoni G.-A., viii, 296. | P. macromphalus W. Blf., iii, 160. |
| P. laomontana Pfr., iii, 160. | P. munipurensis G.-A., iii, 160. |
| P. schistoptychia Mldff., iii, 165. | P. pinacis Bens., iii, 159. |
| P. diptychia Mldff., iii, 158. | P. pettos v. Mart., iii, 156. |
| P. polyptychia Mldff., J. B. | P. oglei G.-Aust., iii, 159. |
| [xiv, 272. | P. serica G.-Aust., iii, 159. |
| P. trochospira Mldff. J. B., xiv, | P. coarctata Mldff. Nachrbl. '94, |
| [273. | [104. |
| P. schlumbergeri Morl., iii, 166. | P. pulvinaris Gld., iii, 157. |
| P. jovia Mab., viii, 156. | P. jugatoria Anc., iii, 166. |
| P. villedaryi Anc., viii, 157. | P. reserata Hde., iii, 166. |
| P. phlyaria Mab., viii, 158. | P. multispira Mldff., iii, 158. |
| P. fimbriosa v. Mart., iii, 158. | P. cutisculpta Mldff., iii, 158. |
| v. emoriens Gred., iii, 158. | P. invia Hde., iii, 165. |
| v. nana Mldff., iii, 158. | P. securi Hde., Fl. Bleu, 141. |
| P. murata Hde., iii, 159. | P. laminifera Mldff., iii, 165. |
| P. stenochila Mldff., iii, 159. | |

Subgenus TRAUMATOPHORA Ancey, 1887.

Traumatophora ANC., Conch. Exch., April, 1887, p. 54.

Shell disk-shaped, with low spire and open umbilicus; granulate. Whorls 5, regularly increasing, the last constricted behind the aperture. Aperture lunar, oblique, with reflexed lip, having within three entering lamellæ upon the outer lip, marked outside by grooves, no parietal processes. Type *P. triscalpta*, pl. 41, figs. 26, 27.

Anatomy unknown. This group and the next differ from *Plectopylis* in lacking transverse internal barriers, but until their soft parts are known they had better be grouped in this place.

- P. triscalpta v. Mart., vi, 8. Central-southern China.
v. fraterminor Gredl. J. B. xi, 137.

Subgenus STEGODERA v. Martens, 1876.

Stegodera Mts., Novit. Conch., iv, p. 150.—PILSBRY, Man. vi, p. 7.—*Steganodera* KOBELT, Illust. Conchylienbuch, p. 236.

Shell *sinistral, disk-shaped*, with low spire and open, deep umbilicus; solid, opaque, brown. Inner whorls slowly increasing, regular; *latter half of the last whorl distorted, straightened*, covering the preceding whorl above. Aperture very oblique, crescentic, toothless; peristome reflexed; *throat very much contracted*. Type *P. angusticollis*, pl. 41, figs. 28, 29.

Anatomy unknown. A single species is known.

P. angusticollis v. Mart., vi, 7. Central China.

Genus CORILLA H. & A. Adams, 1858.

Corilla ADS., Gen. Rec. Moll., ii, p. 208.—SEMPER, Reisen (2), iii, p. 100 (Anatomy).—*Atopa* ALBERS, Die Hel., p. 90 (in part).

Shell *planorboid, with nearly plane spire and broadly open umbilicus*, the contour subcircular or oblong; rather solid, striated above, brown or yellow. Whorls 5–5½, the last deflexed in front. Aperture oblique, *the lip broadly reflexed or recurved*, its ends distant; parietal wall smooth or armed with a strong entering lamina. Interior of the last whorl either without laminae, or obstructed by a series of blades nearly parallel to the direction of the whorl, but having no transverse barriers. Type *C. erronea* Alb., pl. 41, fig. 19. See also pl. 41, figs. 20, 21, 22, *C. rivolii* Desh. Pl. 41, figs. 23, 24, 25, *C. charpentieri* var. *hinidunensis*).

Foot (of *C. erronea*) with undivided sole and without pedal grooves. No mantle lappets. Kidney very short.

Jaw entirely smooth. Radula with about 79–85 teeth in a transverse row. Central tooth not smaller than the laterals, having a single cusp, shorter than the basal-plate. Laterals similar but asymmetrical. Marginals having a large, simple, oblique cusp longer than the square basal-plate (pl. 42, fig. 37, central, 1st and 24th teeth of *C. erronea*).

Genital system elongated, with no accessory organs on the female side. Spermatheca having a long duct, which branches into a *very long flagellum-like diverticulum*, containing a cylindrical spermatophore, which extended from the end of the diverticulum to the vagina. Penis short, swollen distally, continued in the vas deferens upon which the penis retractor is situated, *the distal end of the*

retractor being inserted on the uterus (pl. 42, fig. 38, *C. erronea*). This species is ovoviviparous, the uterus in the individual figured containing two young, having a membranous shell of about 5 mill. diam., and more than 3 whorls.

The shell differs from that of *Plectopylis* in lacking internal barriers transversely obstructing the passage. When internal lamellæ are present in *Corilla* they run parallel to the sutures or nearly so, as in *Polygyratia*. The central teeth are not smaller than the laterals as in *Plectopylis*, and there are further differences in the genitalia. All of the species are from Ceylon.

(Group of *C. erronea*: Parietal fold and internal plicæ present).

C. erronea Alb., iii, 157.

C. anax Bens., iii, 157.

C. rivolii Desh., iii, 156.

C. odontophora Bens., iii, 157.

carabinata Fér.

(Group of *C. charpentieri*: no parietal fold or internal plicæ).

C. charpentieri Pfr., iii, 156.

C. humberti Brot, iii, 156.

v. hinidunensis Nev.

* * *

The nine genera following possess certain features in common, binding them into a great group which the writer, in 1890, named MACROÖN. The literature throwing light upon the anatomy and affinities of the members of this super-generic group is very restricted, three authors only having discussed them from the broad standpoint of modern Helicology. SEMPER, in 1873, recognized the alliance between *Acavus* and *Panda* (with which he also groups *Corilla* and *Caryodes*) shown in the short kidney, simple genitalia, smooth jaw and unicuspid teeth. PILSERY, in 1890, announced that *Acavus*, *Panda*, *Helicophanta* and *Stylodonta* agreed in having eggs of extraordinary size, in which the young undergo prolonged ante-natal development, and the shell actually attains a moiety of its whorls before the independent existence of the creature begins. HEDLEY, in 1892, studied the Australian forms, directing attention to features of their eggs, embryonic shells and anatomy not before appreciated, and gathering into one assemblage *Panda*, *Pedinogyra*, *Caryodes*, *Anoglypta* (and *Liparus*).

The group, as it is herein understood, contains snails with helicoid or bulimoid shells, viviparous or with large, hard-shelled eggs; the

jaw strong and ribless; *all of the teeth* of the radula unicuspid; the genital system without flagellum on penis and with no dart sac or mucous glands on vagina. To these characters we may add that the transverse rows on the radula are moderately straight (not V-shaped), the basal-plates of all the teeth are of the usual quadrate form, and the large embryonic shell is usually sculptured differently from the after-growth. The shell never has teeth or folds in the aperture, although the columella shows often a long spiral, producing a visible sinuosity or truncation below, which, incidentally, in some depressed forms, is shortened into a tooth-like columellar process.

The affinities of the genera *Plectopylis* and *Corilla* may be with this phylum, but if so, the connection is so remote or so much obscured by special modifications, that they may better be left isolated until more fully understood. The Adams brothers, Tryon, Fischer and others, guided by certain analogies in the shells, have classified these Indian genera with the American *Polygyras* and the Eur-Asian *Gonostomas*, but the group so constructed is shown by a study of the soft parts to be a house built upon the sand.

Genus STYLODONTA Crist. and Jan, 1832.

Stylodonta DE CRISTOF. et JAN., Catal. p. 2, type *H. unidentata*.—PILSBRY, Man. Conch., vi, p. 85.—*Stylodon* BECK, Index Moll., p. 46.—ALB.-MART., Die Hel., p. 149 (in part).—*Columplifica* HARTM. (part) Gast. Schweiz, p. 187.—*Pachya* ALB., Die Hel., p. 107 (in part). For anatomy see W. G. BINNEY, Ann. N. Y. Acad. Sci., iii, p. 110 (teeth and jaw of *Studeriana*). VIGUIER, Arch. Zool. Expér. et Générale, viii, p. 529, pl. 40 (genitalia of *Studeriana*). SCHACKO, in Möbius' Beitr. zur Meeresfauna Maurit. u. Seychellen, p. 342 (anatomy of *unidentata*).—MARTENS in v. d. Decken's Reisen in Ost-Afrika, iii, i, p. 56, pl. 1 (varieties of *unidentata*).—NEVILL, P. Z. S., 1869, p. 61 (conditions of snail life on Seychelles).

Shell depressed-turbinate, solid, *with imperforate axis* at all stages of growth; obtuse apex; and *keeled periphery*, at least in the young. Surface yellowish or dark brown; whorls $5\frac{1}{2}$, *the earlier* $3\frac{1}{2}$ *spirally grooved or decussated, forming an embryonic shell about one-third the diameter of the adult*; outer whorls finely wrinkled, the last descending in front. Aperture wide-lunate, quite oblique, the peristome expanded or reflexed. *Columella short, subvertical, its inner edge with a convex lobe or a sharp tooth-like fold*. Type, *S. unidentata*, pl. 38, fig. 9.

Jaw stout, arched, *with no ribs*, but having a few coarse, broad vertical wrinkles (*Studeriana*), or weak, fine and close striæ (*unidentata*).

Radula large, composed of nearly straight transverse rows of teeth. *Central teeth with one broadly rounded cusp* shorter than the basal plates; laterals similar, but the cusp longer and inclined; marginals having an inclined broad mesocone and *developing a small ectocone* (pl. 48, fig. 9, *S. studeriana*).

In *studeriana* the radula measures $12\frac{1}{2} \times 5$ mill., and the formula of teeth is 47.22.1.22.47. In *unidentata* the radula measures 10×4 mill., and the formula is 43.17.1.17.43.

Genitalia imperfectly known by Viguier's figures and description (see pl. 50, figs. 6, 7, 9, *S. studeriana*). The figures show the male system below, female system above. The penis is large. Vagina long, bearing a long duct ending in an oval spermatheca. Uterus large, containing two young shells, which are enclosed in membranous pouches, and attached to them by a sort of umbilical cord formed of the pouch wall (pl. 50, fig. 9). The uterus and pouches are filled with a glairy substance, probably nutritive, and secreted by the albumen gland. The organs above the uterus are unknown.

Large, solid Helices, inhabiting the Seychelles Islands. They are viviparous, bringing forth one or two young at a time. They live on bushes or climbing vines, feed upon green leaves, and aestivate under the soil or in rock crevices. Dufo supposed that only the lighter colored individuals were females, but his observations lack anatomical confirmation. The shells are very dull colored for arboreal forms.

Besides the viviparous reproduction, and the large size of the young at birth, these species are peculiar in having a small ectocone developed on the outer marginal teeth, the dentition being otherwise like that of *Acavus*. The large size of embryonal shell, the ribless jaw, and the peculiar teeth, all forbid the association of these shells with the genus *Camæna*. *S. studeriana* is found upon the island of Praslin only. It lives upon the leaves and trunk of the Coco-de-mer tree. *S. unidentata* occurs on Mahé, Félicité, Silhouette and Curieuse Islands. The young shells are acutely keeled, as in *Pyrochilus*, not rounded as in *Helicophanta*, *Acavus*, *Panda*, etc.

S. unidentata Chemn., vi, 86.

microdonta Dh.

uniplicata Hartm.

normalis Martens.

S. unidentata Chemn.

v. *exanthematica* v. Mts.

v. *militaris* Pfr.

v. *globata* v. Mts.

S. studeriana Fér. vi, 87.

Genus *HELICOPHANTA* Férussac, 1821.

Helicophanta FÉR. (in part), Tab. Syst. des Anim. Moll., p. xxxii; Tab. Syst. de la Fam. des Limaçons, p. 23, 25 (contains, *premier groupe* Vitrinoides, *H. brevipes*, *H. rufa* and *deuxième groupe* Vesiculæ, *H. cafra*, *H. cornu-giganteum*, *H. magnifica*).—BECK, Index, p. 46 (except first species).—ALBERS, Die Hel., p. 110 (in part).—ALB.-MART., Die Hel., p. 148, type *H. magnifica*.—*Leiotoma* SWAINS (in part) Malacol., p. 328.—*Eurycratera* H. & A. Ad., Gen. Rec. Moll., ii, p. 190.

Shell large, capacious, Helicoid or bulimiform, imperforate or umbilicate, consisting of 4–5 rapidly enlarging whorls, the several earlier forming the embryonic shell, *the diameter of which exceeds one-third that of the adult*; the *post-embryonic growth consisting of 1½ whorls or less, the last very large*, deflexed in front. Aperture large; lip narrowly expanded or reflexed, the columellar margin dilated at its insertion. Type *H. magnifica* Fér. (see pl. 38, fig. 4, *H. goudotiana*. Pl. 38, fig. 5, *H. cornugiganteum*).

Animal completely retractile into the shell, having the foot large and fleshy, sole not divided longitudinally, transversely wrinkled: sides of foot granular and obliquely deeply grooved down to the sole edge; tail rounded behind, smooth above. *Mantle margin enormously thickened*, having small right and left body-lobes (pl. 49, fig. 23, showing animal of *H. magnifica* completely retracted within the aperture, the end of tail visible in the mantle cavity).

Jaw strong, slightly arched, smooth; having no trace of vertical striæ (Pl. 49, fig. 19, *H. magnifica*).

Radula resembling that of *Acavus*, *Ampelita*, and especially *Panda*. Central and lateral teeth with single cusps, shorter than the basal-plates; marginals with long, oblique cusps (pl. 48, figs. 12, 13, *H. magnifica*, central with adjacent lateral, a lateral, and group of marginals, with outermost marginal tooth).

Genitalia opening near the right eye-tentacle. *Penis very large* and flattened, the retractor attached midway its length and inserted distally on the lung floor; vas deferens entering beyond the insertion of the retractor, and *continued inside in a vesicular enlargement of the penis-wall* to the apex of penis, where it opens into the large, *smooth-walled* penis-cavity. Vagina large, short; uterus large.

Spermatheca with a long duct, closely bound to the vagina (Pl. 49, fig. 21, *H. magnifica* showing penis and lower portion of uterus and spermatheca duct. Fig. 20, reverse side of female side, showing vas deferens, etc. Fig. 22, penis split along line *a-b* in fig. 21, showing cavity. Fig. 23, section of enlarged wall of penis along line *c-d* of fig. 22, showing vesicular structure beyond the entrance of the vas deferens. Pl. 49, fig. 18, genitalia of *H. goudotiana*, after Brancsik.

The peculiar features of this genus are the very large size of the shell and its extremely large embryonal or nuclear portion; the great thickness of the fleshy mantle-edge, and the peculiar structure of the penis. The unicuspid teeth of the entire radula, and the smooth jaw, are characters common to *Acavus*, *Panda*, and other allied genera. The species are restricted to Madagascar, but the affinities of the genus are entirely with groups of the Seychelles Islands and Ceylon. It is not yet known whether the young are brought forth alive as in *Stylodonta*, or in eggs as in *Acavus*, *Panda* and *Borus*.

That Férussac intended his group *Helicophanta* especially for the glassy, vitrinoid shells subsequently called *Daudebardia*, is evident from his definition, grouping, and the etymology given; and some authors have used the name for these forms. But as Beck, Albers and v. Martens have chosen another course, it seems advisable to follow the precedent of such high authorities, especially since, by the "law of elimination," the same result is obtained. The only other course open to us would be to replace *Daudebardia* by *Helicophanta*, and use the term *Macroön* in a restricted generic sense for this Madagascar group.

The anatomy of *Helicophanta* is known by Semper's description of *H. magnifica* (Nachrbl., 1880, p. 60), and by a figure of the genitalia of *H. goudotiana* by Brancsik (Jahresheft des Naturwissenschaftlichen Vereines des Trencsener Comitates, 1892-3, p. 209, pl. 6, f. 5. The writer has examined *H. magnifica* in the flesh, and the figures on plates 48 and 49 are drawn from this specimen.

Group of cornugiganteum

- | | |
|---|-------------------------------------|
| <i>H. cornugiganteum</i> Chemn. vi, 60. | <i>H. guestieriana</i> Cr., vi, 62. |
| <i>H. betsileoensis</i> Ang., vi, 61. | <i>H. vesicalis</i> Lam. |
| <i>H. ibaraoensis</i> Ang., vi, 61. | <i>bicingulata</i> Smith, vi, 63. |

Group of magnifica.

- | | |
|-----------------------------------|---------------------------------------|
| H. <i>magnifica</i> Fér., vi, 65. | H. <i>souverbiana</i> Fisch., vi, 66. |
| <i>polyzonalis</i> Beck. | <i>f. audeberti</i> Mouss., vi, 67. |

Group of goudotiana.

- | | |
|-------------------------------------|--|
| H. <i>oviformis</i> Grat., vi, 68. | H. <i>grandidieri</i> C. & F., vi, 72. |
| <i>v. phenax</i> Pils., vi, 69. | H. <i>partuliformis</i> Bttg., vi, 72. |
| H. <i>goudotiana</i> Fér., vi, 70. | H. <i>oomorpha</i> Mab., vi, 49. |
| H. <i>echinophora</i> Fér., vi, 71. | |

Group of farafanga, etc.

- | | |
|-----------------------------------|------------------------------------|
| H. <i>farafanga</i> Aug., vi, 73. | H. <i>gloriosa</i> Pfr., vi, 68. |
| <i>farafanganensis</i> C. & F. | H. (?) <i>follis</i> Fér., vi, 74. |

Genus ACAVUS Montfort, 1810.

Acavus MONTF., Conch. Syst., ii, p. 234, type *H. hæmastoma*.—SEMPER, Reisen, p. 99 (anatomy).—SARASIN, Ergeb. Naturwissensch. Forsch. auf Ceylon, i, 1888 (embryology).—BINNEY, Ann. N. Y. Acad. Sci., iii, p. 92 (dentition).—*Otala* (in part) SCHUMACHER.—*Oligospira* ANCEY, Conch. Exch., ii, p. 22, 1887, types *H. waltoni* and *H. skinneri*.

Shell imperforate, globose depressed or globose-trochoidal, solid, *bright colored*. Whorls less than 5, rapidly increasing, *the several earlier forming the nuclear or embryonic shell, which is about one-third the diameter of the adult*. Last whorl deflexed in front. Aperture very oblique, *the lip vividly colored and broadly expanded*; columellar margin long, obliquely descending, *broadly flattened*, the columellar lip adnate. Type *A. hæmastoma*, pl. 38, fig. 1.

Animal with undivided sole, and no pedal grooves; *lung and kidney very short*, the latter opening at the base of the kidney. Body-lobes of the mantle present, of moderate or small size.

Jaw strong, low-arcuate, entirely smooth, without median projection.

Radula having the teeth all unicuspid (pl. 50, fig. 8, 26, *A. skinneri*. Pl. 50, fig. 5, *A. phoenix*. Pl. 48, fig. 14, *A. hæmastoma*.

Genital system having no accessory organs. Penis having terminal retractor, the interior with two longitudinal pilasters below, with a very short, imperforate papilla at their base, at the base of which the vas deferens enters. Spermatheca on a *very short duct* (Pl. 50,

fig. 1, *A. skinneri*. Fig. 3, *A. hæmastoma*). Eggs very large, oval, hard shelled (pl. 50, fig. 4, *A. phoenix*, natural size).

The section *Acavus* comprises Ceylonese Helices of large size and superb coloring. The shell is capacious, with a broad, polished lip of vivid red, lilac, or intense black hue. The young shells at the time of their extrusion from the egg are bright colored, with round periphery, and are about one-third the size of the adult. The teeth are all unicuspid, but the marginals have shorter cusps than in *Helicophanta* or *Panda*; and the shell differs from these groups in its broad columellar lip and brilliant coloring. They are arboreal in habit.

Group of A. hæmastomus.

- | | |
|---------------------------------------|--------------------------------------|
| <i>A. hæmastomus</i> L., vi, 78. | <i>A. prosperus</i> Alb., vi, 80. |
| <i>v. melanotragus</i> Born., vi, 79. | <i>A. phoenix</i> Pfr., vi, 80. |
| <i>v. conus</i> Pils., vi, 79. | <i>A. superbus</i> Pfr., vi, 81. |
| <i>v. concolor</i> , Pils., vi, 303. | <i>v. roseolabiata</i> Nev., vi, 82. |
| <i>A. fastosus</i> Alb., vi, 79. | <i>v. grevillei</i> Pfr., vi, 82. |

Group of A. valtoni (Oligospira).

- | | |
|---------------------------------|-----------------------------------|
| <i>A. valtoni</i> Rve., vi, 83. | <i>A. skinneri</i> Reeve, vi, 84. |
| <i>valtoni</i> auct. | |

Genus PYROCHILUS Pilsbry, 1892.

Phania ALB., Die Hel., edit. Martens, p. 157, type *H. lampas*.—MARTENS Landschn. der Ostasiat. Exped., p. 325.—PILSBRY, Man. Conch., vi, p. 193.—Not *Phania* Meigen, Syst. Beschreib. Eur. zweiflügel. Insekten, iv. p. 218, 1824.—*Pyrochilus* PILSBRY, Proc. Acad. Nat. Sci., Phila., 1892, p. 391.

Shell large, solid, imperforate, depressed; *keeled at the periphery, at least in the young*; convex above and below, unicolored. *Junction of nuclear shell with the after-growth not distinct. Lip expanded, bright colored; columella widened into a flat plate, adnate over the umbilicus, its inner edge blade-like. Whorls about 4½. Type P. pyrostoma (see pl. 38, figs. 2, 3, P. lampas).*

Jaw of *H. pyrostoma* smooth, weakly arched, without median projection. Animal without caudal gland or mantle lobes. Internal anatomy unknown.

A group of handsome, large helices, all of which are still rare in collections. The brilliant coloring of the peristome and the widened

columella, as well as the smooth jaw, are characters which *Pyrochilus* shares with *Acavus*; but in the present group the embryonic shell is not differentiated or demarked from the post-natal portion, as is the oblong, globose nuclear shell of *Acavus*; and the young are acutely keeled, as in *Camæna*.

The few species are from Halmahera and Batjan, Moluccas.

- | | |
|--|---|
| <i>P. lampas</i> Müll., vi, 194. | <i>P. pyrostoma</i> Fér., vi, 194. |
| <i>carina</i> Wood. | v. <i>bucculenta</i> Tap.-Can., vi, 195 |
| <i>magna</i> Schum. | v. <i>extincta</i> Tap.-Can., vi, 195. |
| <i>gigas</i> Swains. | <i>P. xanthostoma</i> Herk., vi, 197. |
| <i>P. sulcocinctus</i> Mart., vi, 196. | |

Genus AMPELITA Beck, 1837.

Ampelita BECK, Index Moll. p. 30 (proposed for *zodiaca*, *xystera*, *labrella*, *lancula*, *madagascariensis*, *clotho*, *alecto*).—ALBERS, Die Hel., 2d edit., p. 163.—PILSBRY, Man. Conch., vi, p. 16.

Shell *depressed*, solid and opaque, varying from broadly openly umbilicated to perforate; spire low, convex; the periphery rounded or keeled. Surface smoothish, sometimes malleated. Aperture very oblique, oblong-truncate; lip expanded above, reflexed below, toothless. Type *A. xystera* Val. (see pl. 41, figs. 31, 32, 33, *A. hemioxia*).

Foot indistinctly tripartite beneath, *the upper surface evenly tuberculate, without longitudinal grooves on back or tail*. Mantle-edge unusually thick, the right body-lappet very small, left lappet situated far to the left, and very low.

Jaw (pl. 51, fig. 5, *A. xystera*) rather widely arcuate, smooth, its anterior surface totally lacking ribs or striæ, very minutely denticulate in the middle of the cutting edge. The jaw figured measures 1.5 mill. wide.

Radula (pl. 51, fig. 4, *A. xystera*. Pl. 49, fig. 25, *A. sepulchralis*) composed of very broadly V-shaped, transverse rows; *all of the teeth unicuspid*. Cusps of all teeth wide and rounded, the centrals and laterals having the basal plates longer than the cusps, marginals with shorter basal plates, as usual.

Genitalia without accessory organs. Penis stout and short, the retractor and vas deferens inserted at its apex; walls of penis cavity corrugated, the vas deferens entering through a small papilla (pl. 51, fig. 6). Externally, *the lower course of the vas deferens is closely*

bound to the penis from its base to its apex; its free portion short. Duct of spermatheca long. Albumen gland large, the ovisperm duct imbedded in it nearly its whole length (pl. 51, figs. 1-3, 6, *A. xystera*. See also pl. 42, fig. 40, *A. loucoubeensis*).

Embryonal whorls about 2, indistinctly marked off from the after-growth; eggs unknown, but apparently one-fifth to one-seventh the diameter of the adult shell.

Distribution, Madagascar. The general aspect of the shells is that of ground snails, but the dentition is more like that of arboreal forms. The prominent features of this genus, apart from its discoidal and peculiar shell, are (1) that all of the teeth of the radula have single, simple rounded cusps, even the outermost marginals; (2) the ribless jaw; (3) the vas deferens is bound to the penis from apex to base of the latter, and the lower course of the ovi-sperm duct is bound to the albumen gland nearly the entire length of that gland.

The genitalia of *A. loucoubeensis* have been figured rudely by Brancsik (Jahresheft der naturwissenschaftlichen Vereines des Trencsener Comitates, xiv-xv Jahrgang, p. 209, pl. 6, f. 3, 1893). The anatomy of *A. xystera* and dentition of *A. sepulchralis* has been examined by myself. The species are numerous, and some of them at least are excessively variable, giving rise to an extensive synonymy. Most of those described without figures by Mabille may prove synonyms or varietal forms of the well-known species.

Group of *A. sepulchralis*.

- | | |
|---|---|
| <i>A. sepulchralis</i> Fér., vi, 18, 301. | <i>A. subsepulchralis</i> Crse., vi, 22. |
| <i>lubrella</i> Lam. | <i>f. obscura</i> C. & F., vi, 302. |
| <i>f. sganziniana</i> C. & F., vi, 301. | <i>f. minor</i> C. & F., vi, 302. |
| <i>f. prœclara</i> C. & F., vi, 300. | <i>sepulchralis</i> Rv., f. 147 b. |
| <i>f. olivacea</i> Pils., vi, 300. | <i>f. nigropurpurea</i> C. & F., vi, 302 |
| <i>f. lethifera</i> C. & F., vi, 300. | <i>A. hova</i> Angas, vi, 24. |
| <i>f. funebris</i> v. Mart., vi, 19. | <i>maderu</i> Mab., vi, 50. |
| v. <i>funebris</i> Morel., vi, 301. | <i>polydora</i> Mab., vi, 50. |
| v. <i>eurychila</i> C. & F., vi, 301. | <i>A. stragulum</i> C. & F., vi, 23, 302. |
| <i>cadaverosus</i> Pils., vi, 19. | <i>A. lamarei</i> Mke., vi, 25. |
| <i>f. pallidior</i> C. & F., vi, 301. | v. <i>sakalava</i> Ang., vi, 26. |
| <i>f. excoriata</i> Mart., vi, 22. | v. <i>catarella</i> Mab., vi, 49. |
| <i>A. watersi</i> Angas, vi, 26. | |

Group of A. omphalodes.

- | | |
|-------------------------------|----------------------------------|
| A. omphalodes Pfr., vi, 26. | A. basizona Mouss., vi, 29. |
| v. loucoubeensis Cr., vi, 27. | A. guillaini Pet., vi, 30. |
| <i>lucubeensis</i> Auct. | A. consanguinea Fér., vi, 30. |
| A. calypso Pfr., vi, 28. | v. subconsanguinea Pils., vi, 30 |
| v. intensior Pils., vi, 28. | A. atropos Fér., vi, 20. |
| A. chlorozona Grat., vi, 31. | A. madagascariensis Lm., vi, 32. |
| A. vesconis Morel., vi, 31. | <i>madecassina</i> Fér. |
| (?= <i>chlorozona</i> .) | A. robillardi Aug., vi, 32. |

Group of A. xystera.

- | | |
|---------------------------------|-------------------------------------|
| A. novacula Mart., vi, 33. | A. cazenavetti F. & B., vi, 35, 302 |
| A. hemioxia Pils., Naut., viii. | A. lancula Fér., vi, 36. |
| A. xystera Val., vi, 33. | v. terveriana Grat., vi, 37. |
| A. shavi Smith, vi, 34. | A. fulgurata Sowb., vi, 36. |
| A. stumpffii Kob., vi, 35. | A. (?) testudo Pfr., vii, 89. |
| f. albina Brancsik. | A. unicolor Pfr., vi, 37. |

Group of A. lanx.

- | | |
|----------------------------------|--------------------------------|
| A. lanx Fér., vi, 38. | A. lanciformis Bttg., vi, 39. |
| v. radama Less., vi, 38. | v. nossibeensis Bttg., vi, 40. |
| A. suarezensis C. & F., vi, 302. | v. campbelliana Pils., vi, 39. |

Group of A. duvallii.

- | | |
|----------------------------|-------------------------------|
| A. duvallii Pet., vi, 41. | A. clotho Fér. vi, 42. |
| A. pereyana Smith, vi, 42. | A. granulosa Fér. vi, 43. |
| A. lachesis Fér., vi, 41. | A. galactostoma Pfr., vi, 44. |

Group of A. covani.

- A. covani E. A. Smith, vi, 44.

Unfigured species of uncertain affinities.

- | | |
|----------------------------------|---------------------------|
| A. campelica Mab., vi, 54. | A. monacha Mab., vi, 47. |
| A. cyanostoma Mab., vi, 48. | A. omoia Mab., vi, 46. |
| A. erythromorpha Mab., vi, 51. | A. paroapta Mab., vi, 55. |
| A. galactostomella Mab., vi, 53. | A. porcaria Mab., vi, 45. |
| A. gaudens Mab., vi, 54. | A. scotina Mab., vi, 46. |
| A. gaudiella Mab., vi, 55. | A. stilpna Mab., vi, 53. |

A. gonostyla Anc., vi, 45.

A. subfunnebris Mab., vi, 55.

A. lithida Mab., vi, 53.

A. thelica Mab., vi, 47.

A. lychna Mab., vi, 52.

Subgenus *PÆCILOSTYLUS* Pilsbry, 1890.

Pæcilstylus PILS., Man. Conch., vi, p. 56.—*Eurystyla* ANCEY, not Stal.

Shell compact and globose or globosely-elevated, imperforate or nearly so, smooth and shining, vividly colored. Peristome blunt, narrowly expanded, the columellar margin reflexed. Type *A. viridis* Dh., pl. 38, figs. 10, 11.

Anatomy unknown. These handsome shells have the appearance of the Philippine Island *Cochlostylas*. They are probably arboreal forms.

A. viridis Desh., vi, 56.

A. cerina Morel., vi, 57.

Genus *PEDINOGYRA* Albers, 1860.

Pedinogyra ALB., Die Hel., p. 162, type *H. cunninghami*.—PILSBRY, Man. Conch. vi, p. 13.—HEDLEY, Records of the Australian Mus., ii, 29, and Proc. Roy. Soc. Queensl. vi, p. 63, pl. 3, (anatomy).

Shell large and *discoidal*, with *flattened spire and broadly open umbilicus*, solid, opaque and colored. Whorls 5–6, the last large, *deeply deflexed in front*. Aperture oblong-truncate, nearly horizontal, the lip slightly expanded, blunt. Type *P. cunninghami*, pl. 17, figs. 5, 6.

Jaw arcuate, *ribless*, faintly striated transversely and longitudinally, the ends rounded (pl. 17, fig. 2, *P. cunninghami*).

Radula having *the middle cusp only developed, on all the teeth*. Centrals and laterals with the cusp shorter than the basal-plate. Marginals with a single ovate inclined cusp, projecting beyond the square basal plate (pl. 17, fig. 4, a central with 1st, 12th and 17th laterals, and 27th marginal tooth of *P. cunninghami*).

Genitalia having the penis long, retractor and vas deferens inserted at its apex, lower course of the latter large. Upper part of the vagina bearing the long stalked spermatheca, and *a long appendicula*, and bound firmly to the body-wall at this point. Ovo-testis imbedded in the digestive gland, as usual (pl. 17, fig. 1, *P. cunninghami*). Eggs globose, white, 9 mill. in diameter, hard, calcareous,

brittle, coarsely granular outside, smooth within (pl. 17, fig. 3, *P. cunninghami*).

Distribution, Queensland and New South Wales, Australia. *P. cunninghami* has been found living "under heaps of stones and drifts of dead leaves, or buried in clusters of from 3 to 6 in the soil. The sharp edges of broken shells are used by the aborigines of Port Curtis to polish their spears, boomerangs and waddies."

The more conspicuous characters of this type are its broadly umbilicated, quoit-like shell, the presence of an appendicula on the vagina, and the unicuspid marginal teeth. Both shell and dentition resemble the South American genus *Macrocyclus*. Two specific forms have generally been recognized: a large solid Queensland form, *cunninghami*, and a smaller, thinner, keeled form of New South Wales, *mühlfeldtiana*; but Hedley finds that they intergrade. This difference from north to south is exactly paralleled in other Australian Helices. Compare *Thersites richmondiana* of Queensland with *T. novæhollandiæ* of New South Wales; the solid, highly colored *Sphærospiras*, with the thinner, keeled *Badistes*, etc. It is a well established rule that as we pass southward from subtropical Queensland to the temperate southern regions of Australia, the shells become thinner, smaller, less richly dyed, and often develop a more or less obvious peripheral keel.

While the systematic position of this genus in the series cannot be regarded as unquestionable, I agree with Hedley that it is probably to be regarded as a depressed manifestation of *Panda*. It does not agree with that genus in that *Pedinogyra* has the ovo testis imbedded in the digestive gland. In *Panda* it is not so imbedded, but is free as in the *Bulimi*.

<i>P. cunninghami</i> Gray, vi, 14.	<i>v. compressa</i> Mouss.
<i>v. mühlfeldtiana</i> Pfr., vi, 15.	<i>v. minor</i> Mouss.

Genus ANOGLYPTA Martens, 1860.

Anoglypta v. MART., Die Hel., p. 312, type *H. launcestonensis*.—PILSBRY, Man. Conch., vi, p. 92.—HEDLEY, Proc. Linn. Soc. N. S. Wales (2), vi, p. 22 (anatomy); and Rec. Austr. Mus., ii, p. 29.

Shell umbilicated, subtrochiform, conoidal above, convex below the peripheral carina; *lusterless and spirally lirato-tuberculate above, polished below*. Whorls 5½. *the apical ones spirally lirulate*, the last suddenly and deeply deflexed in front. Aperture small, subhor-

izontal; *outer lip thin, not expanded, having a projecting angle just above the periphery*; columellar lip slightly thickened and expanded toward the insertion. Type *A. launcestonensis*, pl. 29, fig. 16.

Animal having the sole undivided; upper surface granulated, the granules arranged in indistinct rows on the back; facial or lateral grooves distinct; tail pointed and flattened. Mantel edge thick, developing a large left body-lobe in front of the respiratory pore, and a triangular right one below and behind it. Genital foramen upon the right lateral groove, below and behind the eye stalk.

Jaw arcuate, with a slight median projection; *very finely, irregularly striated vertically* (pl. 47, fig. 6).

Radula having *all of the teeth unicuspid*. Central and lateral teeth (pl. 48, fig. 10) having the basal-plates contracted on the outer margin, forming a sort of socket for a projection on the inner margin of each succeeding plate. Marginals with long, broad, oblique cusps, becoming shorter on the outer ones (pl. 48, fig. 11, three groups of marginal teeth, the right hand group from the outer edge of radula).

Genitalia having a very short vestibule; lower part of vagina swollen, enlarging again above as it passes into the spermatheca duct. This duct is *very long*, slender and closely bound to the uterus above, ending in a globular receptacle. Below, the *lower portion of the duct is very large*, with muscular walls, and bears a *short blind sack, directed downwards*. This sack, and the enlarged duct and vagina together, have strongly ridged internal walls. Uterus having a very narrow neck (pl. 47, fig. 5, showing neck of uterus and its union with vas deferens, below the blind sack of spermatheca duct). Ovo-testis composed of a very long, straggling series of irregular clusters of fine follicles, imbedded in the liver along its inner surface. The penis has the vas deferens inserted below the apex, above and opposite to the insertion of the retractor muscle, which is very long, and attached distally *far back on the lung floor*. *Penis cavity closely and strongly ribbed longitudinally, with no papilla*. *Vas deferens firmly bound to the penis its entire length*, and also firmly bound to the vagina Pl. 47, fig. 8, showing course of *v. d.* on penis. (See pl. 47, figs. 5, 7, 8, *A. launcestonensis*).

Anoglypta is a monotypic genus created for one of the most peculiar of all Helices. In its coarse spirally lirata-tuberculate sculpture *A. launcestonensis* stands unique; and our knowledge of

the soft parts of the animal throws but a feeble light on the questions of its origin and affinities. The eggs are like those of *Caryodes*. *The sculpture of the earlier whorls is almost exactly as in that genus.* The perfectly simple, unexpanded edge of the lip, and the basal color zone are also other points of likeness between *Anoglypta* and the *Caryodes*, *Panda*, *Pedinogyra* series. The genital system is peculiar in having the vas deferens closely bound in the integument of the penis, as in *Ampelita*, and in the backward-projecting sack on the spermatheca duct. This may perhaps be interpreted as an appendicula, or it may be an independent development for the reception of spermatophores, like the diverticulum in the true *Helices*. The jaw is not smooth, as in all other genera of the Macroön group, but finely striated as in *Pyramidula*. The radula is altogether similar to that of *Helicophanta*, *Panda*, *Caryodes*, etc. On the whole, it seems that Charles Hedley's estimate of the affinities of *Anoglypta* is by far the most probable yet advanced. The position assigned by von Martens, and those formerly suggested by the writer, are clearly untenable.

The only species of this genus, Mr. Hedley writes, is confined to a mountainous district in north-eastern Tasmania. He found it plentiful among the fern-tree gullies. "Habits very shy and timid, crawling very slowly. It frequents damp places under logs and decaying stems of tree-ferns. The fire and ax of civilization threaten to diminish the already narrow range of this splendid and interesting species, but its haunts are so rugged and remote that I do not fear its extinction."

A. launcestonensis Reeve, vi, 93. N.-E. Tasmania.

Genus CARYODES Albers, 1850.

Caryodes ALB., Die Hel., p. 141, type *Bulinus dufrasnii*.—MARTENS in Die Hel., p. 228.—SEMPER, Reisen im Arch. Phil., Land Moll., p. 102 (anatomy).—TENISON-WOODS, Proc. Linn. Soc. N. S. W. iii p. 81 (variation, etc.).—HEDLEY, Proc. Linn. Soc. N. S. W. (2), vi, p. 19 and Rec. Austr. Mus., ii. p. 29 (external anatomy, systematic position, etc.).

Shell *Bulinoid*, imperforate, varying from oblong to globose-ovate; thin but solid, composed of about 5 whorls, *the earlier ones spirally lirulate, separated by a crenulated suture*, apex obtuse, last whorl punctulate above, *encircled just below the periphery by a dark girdle bordered with light*. Aperture higher than wide, subvertical,

the outer lip thin and not expanded, *columella somewhat sinuous, subtruncate below*, with a closely adherent reflexed umbilico-parietal callus. Type *C. dufresnii*, pl. 46, figs. 15, 16.

Foot undivided and without pedal grooves. Back ornamented with long, narrow tubercles, arranged in about a dozen longitudinal rows; sides and tail divided into irregular polygonal spaces, which are partially subdivided and finely granulated; tail tapers slightly, is rounded behind, and never keeled. Genital orifice behind the right eye-stalk, just beneath the facial groove. Mantel with a left body-lobe. Kidney opening at its base.

Jaw arcuate, smooth, with no median projection (pl. 42, fig. 44).

Radula with 81-87 teeth in a transverse row, all of them unicuspid (pl. 49, fig. 24).

Genitalia (pl. 42, figs. 41, 42, 43) partially everted in the example figured, a short papilla bearing a long thread projecting from the foramen. Penis sac long and stout, the retractor and vas deferens inserted at its apex; within the penis lies an adnate fleshy pillar (pilaster), free at its distal end; its outer walls closely grooved, covered with thick epithelium, and in the folds lay irregular plates of lime. In a section the pilaster shows outside the external papilla, separated by grooves; then follows a sphincter muscle, then an irregular, apparently spiral muscle (pl. 42, fig. 43, pilaster, papilla and thread, Fig. 41. section of same, showing star-shaped cavity, etc.). Spermatheca having a long duct, near the mouth of which is attached a long appendicula.

Eggs hard-shelled, regularly oval, white, shining, minutely granular, measuring 11 by 8 mill. (pl. 42, fig. 46).

The external appearance of the animal and the form of the jaw, teeth and genitalia, are very similar to *Panda*, fully supporting the classification proposed by Hedley in 1892. The shell resembles that of *Panda* in its bulimoid contour, simple lip, and the sinuous subtruncate columella. It differs from that Australian genus in the lobed or crenulated sutures, and the sculpture of the embryonic whorls, which recall *Anoglypta*. The embryonic shell of *Liparus* differs very much in sculpture from that of *Panda*, *Caryodes* or any other *Helix* known to me.

The genus contains but one species, the *Bulimus dufresnii* of authors, *Helix dufresnii* Leach. The shell varies from oval to almost globose. The ground-color varies from light yellow to deep maroon or dull olive, but the color-band is permanent. The eggs

are disproportionately large for the animal, and deposited under logs during October and November. The size of the egg probably varies with that of the mature shell, as is the case with *Glandina*. The young, upon emerging, are obliquely orbicular in shape (pl. 42, fig. 45).

C. Dufresnii Leach. Tasmania.

Genus PANDA Albers, 1860.

Panda ALBERS, Die Heliceen, edit. Martens, p. 149, type *H. falconeri* Reeve.—SEMPER, Reisen, p. 103 (anatomy).—HEDLEY, Rec. Australian Museum, ii, p. 26 (anatomy and systematic position).—PILSBRY, Nautilus, vi, p. 9, May, 1892 (systematic position).—Not *Panda* Heyden, Isis, 1826, p. 612 (*Acarina*).

Shell *Bulimoid* rather than *Helicoid*, globose-oblong, higher than wide, umbilicate or imperforate, thin but strong. Surface smoothish. Whorls $4\frac{1}{2}$, the earlier two finely beaded, indistinctly marked off from the smoother or spirally striated after-growth (pl. 46, fig. 12, *P. atomata*); apex obtuse. Last whorl very large, hardly descending in front. Aperture large, subvertical, higher than wide; outer lip thin, not expanded; columellar lip reflexed toward its insertion. Type *P. falconeri*, pl. 46, fig. 11 (*P. larryi*, pl. 46, figs. 13, 14).

Animal externally like *Caryodes*. Sole indistinctly tripartite; back with some ill-defined longitudinal granulation; sides and tail with flat, irregularly polygonal granulation; tail rather flat and sharply pointed. Lung cavity and kidney short. Mantle edge thick, without lobes (pl. 46, fig. 13, *P. larryi*).

Jaw arcuate, smooth, with a slight median projection or none (pl. 47, fig. 2, *P. atomata*).

Radula having all of the teeth unicuspid. Marginal teeth with long, oblique cusps (pl. 48, figs. 15, 16, *P. atomata*. Pl. 48, fig. 17, *P. falconeri*).

Genital system having the penis stout, the retractor attached to its summit, and distally arising from the columellar retractor muscle. At the base of the retractor is inserted an epiphallus about as long as the penis, then narrowing into the vas deferens. The epiphallus is partly filled by a "pilaster," or fleshy cord adnate along one side, which passes into the penis, and there expands into a peculiar penis papilla (fig. 3); internal walls of penis having several weak longitudinal fleshy folds. High on the vagina opens the duct of the spermatheca, and opposite it enters a long appendicula (pl. 47, figs. 3, 4, *P. atomata*. Pl. 47, fig. 1, *P. falconeri*).

Eggs large, white, hard-shelled.

The special sculpture of the apex is generally worn off in adult shells. The latter whorls are peculiarly variegated with chocolate streaks and vermiculate lines on a yellow ground, and usually show spiral bands of blotches.

This genus is more nearly allied to *Caryodes* than to any other group. These two Australian genera resemble *Acavus*, *Helicophanta* and *Ampelita* in their smooth jaws, unicuspid side teeth and comparatively large eggs, but differ from them in the simple lip of the shell, the presence of an appendicula, the insertion of the penis retractor muscle on the main columellar retractor instead of on the floor of the lung, and in the freedom of the ovotestis from the digestive gland. The relationship between the Australian and the Indo-Madecassine genera is therefore by no means intimate. Hedley, in the important paper on these snails cited above, brought the Australian *Liparus* into the group he composes of *Panda*, *Caryodes*, *Pedinogyra* and *Anoglypta*, but I am unable to follow his classification to this extent. *Liparus* seems to me to belong to a distinct stock I look to *Otostomus*, *Placostylus*, etc., for its kindred.

The generic term *Panda* Heyden, 1826, has not been used by recent araneologists, and the definition given by Heyden in his analytical table is not sufficient to rescue it from the status of a *nomen nudum*. This antiquated use which can never be revived should not prevent us from retaining Albers' name for the present group.

P. falconeri Rve., vi, 75.

v. *maconelli* Rve., vi, 76.

v. *azonata* Hedl., viii, 293.

v. *tigris* Hedl., viii, 293.

P. ponsonbyi Ang., P. Z. S. 1877, *P. larryi* Braz., P. Z. S., 1871, p. 321.

P. atomata Gray.

v. *kershawi* Braz., viii, 293.

v. *elongata* Hedl., viii, 294.

v. *azonata* Hedl., viii, 294.

* * *

The following genera, *Macrocyelis*, *Solaropsis* and *Chalepotaxis* are intercalated here in the *Helix* series provisionally, pending the discovery of their true affinities by the examination of the internal anatomy. The dentition of *Macrocyelis*, now for the first time made known, is excessively peculiar, and comparable only to that of *Helicophanta* and its allies. Of *Solaropsis* there is nothing known sufficient to justify a guess at its affinities. *Chalepotaxis* has the

highly modified radula of a tree-snail, but so abnormal that it affords, little ground for conjecture.

The Indo-Chinese group *Gancsella* is placed here because it was omitted in its proper place in the Epiphallagonous series, with *Chloritis*, *Planispira*, *Papuina*, etc.

Genus MACROCYCLIS Beck, 1837.

Macrocyclus BECK, Index Molluscorum p. 24, for *H. peruviana* (*laxata*) and *H. cunninghami*.—ALBERS, Die Hel. p. 128 (restricted to *H. laxata*).—MARTENS, Die Hel. p. 75 (in part).—Not *Macrocyclus* of American authors, = *Selenites*.

Shell *disk or quoit shaped* with low, convex spire and *widely open* funnel-shaped *umbilicus*. Whorls $4\frac{1}{2}$ –5, the last large, *deeply descending in front*; finely and densely striated; yellowish, not banded. Aperture very oblique, oval, wider than high, the peristome narrowly expanded throughout, reflexed below, the ends approaching. Type *M. laxata* Fér., pl. 22, figs. 11, 12.

Genitalia, jaw, etc., unknown. Radula strap-shaped as usual, bearing many rows of 33.1.33 teeth, *all unicuspid*; centrals with the single conical cusp projecting beyond the basal-plate; laterals similar but asymmetrical; marginals like the laterals, but the basal-plates are shorter and the cusps longer, oblique and simple (pl. 51, figs. 1, 2, central with adjacent 3 laterals, 6th and 9th laterals, 12th and 13th transition teeth, 16–18 and 25–33 marginal teeth, of *M. laxata*).

The shell in this group, except in being uniformly light colored, is strikingly like that of the Australian *Pedinogyra*; and the dentition is altogether similar to *Pedinogyra*, *Panda*, *Anoglypta* and *Helicophanta* in the total absence of side cusps; the marginal teeth having long, oblique mesocones as in those Old World genera. In view of the fact that, although unicuspid marginal teeth are peculiarly characteristic of the *Macroon* group, they reappear in a few other Helices, I do not feel justified in associating *Macrocyclus* with *Pedinogyra* and its allies. We may better suspend judgment until the genitalia and jaw give their more definite testimony. The radula is very different from that of *Selenites*.

The single species inhabits Chili.

M. laxata Fér., iii, 109.

peruviana Lam.

deshayesi Anton.

cincinnus Rve.

Var. *banksii* Cuming, iii, 109.

maxima Beck.

umbilicata Anton.

? *gayi* Hupé.

laxata Rve.

Genus SOLAROPSIS Beck, 1837.

Solaropsis BECK, Index Moll. p. 27 (for *heliaca*, *moricandi*, *braziliensis*, *pellisserpentis*).—Martens, Die Hel., p. 164 (type *H. pellisserpentis* Ch.); Ostas. Landsch. p. 7 (jaw).—PILSBRY, Man. Conch. v, p. 177.—*Solarium* SRIK, Test. Brazil, p. 23.—*Helicella* SWAINS. Malacol., p. 333 (1840).—*Psadara* MILLER, Malak. Bl. xxv, p. 162, 1878, (for *boetzkessi*, *selcuostoma*, *iris*).—*Ophiospila* ANCEY, Conch. Exch., i, p. 64, 1887 (*kühni*, *andicola*, etc.)

Shell umbilicate, rather depressed, with convex or flat spire, convex below, the periphery rounded or angular. Decorated with a peculiar pattern of lunate brown spots and streaks in bands on a light ground. Surface granulate, hirsute or plicate-striate. Last whorl not deflexed in front. Aperture oblique, lunate; lip expanded or reflexed, its ends distant. Type *S. pellisserpentis*. (See pl. 46, fig. 20, *S. serpens*; fig. 21, *S. braziliana*).

Animal long and slender; jaw smooth, without ribs; anatomy otherwise unknown.

Distribution, southern Brazil and Peru to Columbia and Guyana; one species *S. tilorieusis*, in Costa Rica. They are forest snails, living under stones and bark, etc.

The name *Ophidermis* Agassiz (*Ophidermis* Herrm.), said to have been proposed in Charpentier's Catalogue of Swiss Mollusks, 1837, but not mentioned therein, has found its way into the synonymy of this genus, through a guess of Hermannsen's based on its suggestive etymology. It was never published except as a nude name, for the snake skin can hardly be said to cover its nakedness. It is not now worth the expense of clothing; especially since it really pertains to something of the nature of *Cyclostoma* (see Agassiz, Nomencl. Zool., Moll., p. 62).

S. pellisserpentis Chemn., v, 178. *S. napensis* Crosse, v, 188.

constrictor Hupé.

S. rosarium Pfr., v, 188.

S. serpens Martyn., v, 178.

S. kuhni Pfr., v, 189.

pellisserpentis Hupé et al.

S. andicola Pfr., v, 189.

colubrina Perry.

S. quadrivittata Hid., v, 190.

S. pellisboæ Hupé, v, 180.

S. diplogonia Dohrn., v, 190.

boa Hupé.

S. nubeculata Desh., v, 191.

S. anguicula Hupé, v, 180.

S. catenifera Pfr., v, 191.

S. vipera Pfr., v, 181.

S. catenulata Anc., viii, 261.

S. monolacca Pfr., v, 182.

S. marmatensis Pfr., v, 191.

- | | |
|-------------------------------------|---|
| S. gibboni Pfr., v, 182. | S. incarum Phil., v, 192. |
| <i>magnifica</i> Lea not Fér. | S. monile Brod., v, 192. |
| v. <i>amori</i> Hid., v, 183. | <i>planorbis</i> Jay. |
| v. <i>cousini</i> Jouss., v, 183. | <i>boetzkessi</i> Mill. |
| S. <i>praestans</i> Pfr., v, 184. | S. <i>castelneaudii</i> D. & H. v, 193. |
| S. <i>braziliana</i> Fér., v, 184. | <i>castelnaudii</i> Hupé. |
| ? <i>moricandi</i> Beck. | <i>castelnaui</i> Pfr. |
| S. <i>heliaca</i> Orb., v, 135. | S. <i>selenostoma</i> Pfr., v, 193. |
| S. <i>pascalia</i> Caill., v, 186. | <i>sclerostoma</i> Rv. |
| <i>amazonica</i> Hupé. | S. <i>hians</i> Pfr., v, 194. |
| S. <i>amazonica</i> Pfr., v, 186. | S. <i>tiloriensis</i> Ang., v, 194. |
| S. <i>feisthameli</i> Hupé, v, 187. | S. <i>iris</i> Mill., v, 195. |
| <i>punctata</i> Wagn. not Müll. | S. <i>rugifera</i> Dohrn., v, 195. |
| v. <i>planior</i> Pils., v, 188. | S. <i>elaps</i> Dohrn v, 196. |

Genus CHALEPOTAXIS Ancy, 1889.

Chalepotaxis Ancy, Conch. Exch. Aug. 1887, p. 22, type *Nanina* ? *infantilis* Gredl.—Cf. SCHACKO, Jahrb. D. M. Ges. XI, p. 157, pl. 3, f. 7–10 (dentition).

Shell small, thin, shining, orbiculate-depressed, with narrow umbilicus and low-conic spire; last whorl scarcely descending in front; aperture lunate, slightly oblique, the peristome simple and unexpanded except at the columella, where it is slightly dilated. Type *C. infantilis* Gredler, pl. 57, fig. 34.

Jaw very delicate. Radula (pl. 57, figs. 35–39, *C. infantilis*) with the formula 25.1.25. Teeth all similar in form and in v-shaped rows. Middle teeth having the median cusp enormously dilated into an elliptical gouge projecting far beyond the basal-plate; neck of the cusp narrow, bottle-shaped; side cusps basal, rudimentary and vertical; basal-plate narrow in front, widening and squared behind. Lateral teeth similar, but the large cusp bends outward and the entocone is suppressed. Marginals differ only in becoming smaller, with the ectocone decidedly longer (pl. 57, figs. 35, 37, group of middle and lateral teeth; fig. 36 group of marginals; fig. 38, a lateral in profile, turned 90°; fig. 39, a lateral turned 45°).

This genus is founded upon one species having a shell resembling an immature *H. similis* Fér., or *pyrrhozona* Phil. and a type of dentition considerably like *Oxychona*. The jaw is very imperfectly known, and the genital system is unobserved. I am disposed to

believe, with Schacko, that it is a modified branch of the *Helix* stock. It is probably arboreal in habit. Only species, *C. infantilis* Gredl., ii, 216. Prov. Kwang-si and Hunan, China; Tonquin.

Genus GANESELLA Blanford, 1863.

Ganesella BLANF. Ann. Mag. Nat. Hist. (3), xi, p. 86, type *H. capitum* Bens. (Feb., 1863).—*Satzuma* A. ADAMS, Ann. Mag. (4), i, p. 463, type *H. japonica*, *patruelis*, *peculiaris*, (June, 1868).—*Fru-ticotrochus* KOBELT, Fauna Molluscorum extramarinorum Japoniæ, 1879, p. 48, same types.—*Trochomorphoides* NEVILL, Hand List Moll. Ind. Mus. pt. 1, p. 80, type *H. aeris* Bens. (1878).

Shell more or less trochiform, umbilicated (or rarely imperforate), rather thin; light-colored, plain or with a peripheral line; surface with growth-lines only or densely spirally striate; whorls $4\frac{1}{2}$ –6, the last a little descending in front. Aperture oval or angular-lunate, oblique, toothless or with a blunt columellar fold; lip expanded, broadly dilated at columellar insertion. Type *G. capitum*, pl. 55, fig. 18. See also pl. 64, fig. 7, *G. japonica*.

Animal (of *G. japonica*) with the foot very long and narrow, sole not distinctly tripartite; upper surface finely and feebly granular, back with a pair of dorsal grooves, no facial grooves; tail narrow, long, with a median longitudinal groove above.

Jaw arcuate, with about 9 ribs denticulating the lower margin (pl. 60, fig. 1, *G. japonica*).

Radula of the type usual in ground snails. Middle tooth with mesocone only developed, shorter than basal-plate, side-cusps represented by slight lateral extensions. Laterals similar but with the cusp longer. Marginals with oblique, bifid inner cusp and an ectocone (pl. 60, fig. 2, *G. japonica*).

Genital system (Frontispiece, figs. 1, 2, *G. japonica*) having the penis long and twisted, ending in a curved blind sack with corrugated inner walls (fig. 2, apex of penis and sack opened); epiphallus long, bearing the retractor, terminating in a flagellum and the vas deferens. Vagina extremely long, the spermatheca duct inserted high. Spermatheca oblong, on a stout duct, neither duct nor bulb being bound to uterus. No dart sack or mucus glands.

Distribution, Japan and China to India, southeast to Sumatra Borneo and Philippine Is.

This genus has the genital system, jaw and radula, as well as the tail-groove of *Chloritis* (see Pl. 28, figs. 1 to 9), but the penis-papilla

is absent, and the spermatheca duct is inserted higher on vagina. The shell has somewhat the contour of *Papuina*. The anatomy of the group has been a complete surprise to me, for I had relegated it to the *Eulota* group before dissecting specimens. It is now perfectly clear that it belongs in the vicinity of *Chloritis* and *Papuina*, and is the most northern in distribution of that group of genera. Probably some of the species now referred to *Ganesella* will prove to belong to other groups, such as the East Asian Fruticicoloid section.

There is much variation in contour, number of whorls, size and umbilicus among the members of this genus; and a subdivision of it into sections will no doubt be made eventually. It is to be hoped that such division will not be attempted until it can be placed on a firm footing by the examination of the anatomy of many species; and anatomical data are also required before the boundary line between *Ganesella*, *Eulota*, *Plectotropis* and the East Asian Fruticicolas can be definitely drawn. In some cases the shell alone is not sufficiently characteristic to base the classification of these groups upon, even when the relationships of the main types have been elucidated.

Japanese, Liukiu Is. and Formosa species.

- | | |
|--|---|
| <i>G. papilliformis</i> Kob., iii, 217. | <i>G. conella</i> Ad., iv, 56. |
| <i>G. japonica</i> Pfr., iii, 218. | <i>G. lischkeana</i> Kob., iii, 220. |
| ? <i>vitracea</i> Fér., vii, 106. | <i>G. peculiaris</i> A. Ad. |
| <i>G. conospira</i> Pfr., iii, 218. | <i>G. gibbosa</i> A. Ad. |
| <i>G. tabuensis</i> Anc., iii, 218. | <i>G. ? serotina</i> A. Ad. |
| <i>patruelis</i> Ad. not Ang. | <i>G. sphærulata</i> Reinh. |
| <i>G. sphinctostoma</i> Ad., iii, 218. | <i>G. largillierti</i> Ph., iii, 218. |
| <i>G. cardiostoma</i> Kob., iii, 219. | <i>immaculata</i> A. & R. |
| <i>G. hilgendorffi</i> Kob., iii, 219. | <i>G. albida</i> Ad., iii, 218. |
| <i>G. verrucosa</i> Reinh., iii, 219. | <i>G. fulvicans</i> H. Ad., iii, 220. |
| <i>G. macrocycloides</i> Kob., iii, 219. | <i>G. sphæroconus</i> Pfr., viii, 200. |
| <i>G. eumenes</i> West., viii, 199. | v. <i>campochilus</i> Pils., viii, 201. |
| <i>G. goodwini</i> Sm., iii, 219. | <i>G. scævola</i> Mts., vi, 306. |
| <i>G. conulina</i> Mart., iii, 219. | |

Chinese species.

- | | |
|---------------------------------------|-------------------------|
| <i>G. gradata</i> Mldff. | <i>G. alveolus</i> Hde. |
| <i>G. brevibarbis</i> Pfr., iii, 221. | <i>G. ternaria</i> Hde. |

- | | |
|-----------------------------------|-------------------------------|
| G. squamosella Hde., iii, 221. | G. vitreola Hde. |
| G. micacea Hde., iii, 221. | G. ingloria Hde. |
| G. phyllophaga Hde., iii, 221. | G. subsquamulata Hde. |
| G. dormitans Hde., iii, 222. | G. subparasitica Hde. |
| G. ? arbusticola Dh., iii, 222. | G. subgriseola Hde. |
| G. bizona Gredl. | G. ? galera Hde. |
| G. squamulina Gredl. | G. ? peræruginea Hde. |
| G. trochacea Gredl., viii, 200. | G. radulina Hde. |
| G. microtrochus Möll., viii, 201. | G. virilis Gredl., iv, 259. |
| G. lepidostola Hde., iv, 55. | v. subfusca Gredl. |
| v. trochospira Mlldff. | G. laurentii Gredl., iv, 259. |
| G. schomburgiana Mlldff. | G. editha A. Ad., viii, 204. |
| trochulus Mlldff. not Ad. | |

Species of India, Tonquin, etc.

- | | |
|----------------------------------|----------------------------------|
| G. capitium Bens., iii, 74. | G. phonica Mab., vii, 83. |
| v. hariola Bens., iii, 74. | G. bouryi Morg., iii, 172. |
| G. acris Bens., iii, 74. | G. rostellata Pfr., vii, 83. |
| puellula Bens. | G. scenoma Bens., vii, 83. |
| G. perakensis Cr., vii, 82. | G. hyperteleia Morl., viii, 203. |
| v. subperakensis Pils., vii, 82. | G. mera Rve., iii, 94. |
| G. galea Bens., iii, 75. | |

Species of Sumatra, Java and Borneo.

- | | |
|------------------------------|------------------------------|
| G. gysseriana Pfr., iii, 75. | G. niahensis G.-A., vii, 85. |
| ? conulus Mart. not Pse. | G. tigeensis G.-A., vii, 85. |
| G. bantamensis Sm., vii, 84. | G. subflava G.-A., vii, 85. |
| G. rufiflosa Bock, vii, 84. | G. angulata Iss., iii, 75. |

Philippine Island species.

- | | |
|-------------------------------------|----------------------------------|
| G. trochomorpha Mlldff., viii, 202. | G. fernandezi Hid., viii, 202. |
| microtrochus Mlldff. olim. | G. planasi Hid., viii, 202. |
| v. mimula Mlldff. | G. poecilotrochus Mlldff. Nachr. |
| v. dimidiata Mlldff. | ['95, 114. |
| G. trochus Mlldff., viii, 201. | |

A section of *Ganesella* is probably indicated by the lack of flagellum and the columellar fold of *H. ptychostyla* (see Semper, Reisen, p. 247, footnote, pl. 16, f. 27). The appendage of penis, figured for *G. japonica*, is developed, and somewhat sacculated or feathered. These

species were formerly grouped in *Plectotropis*, but the lack of dart sack and mucus glands widely sunders them from that group.

- | | |
|--------------------------------------|-------------------------------------|
| G. <i>ptychostyla</i> Mart., iv, 58. | G. <i>styloptycha</i> Pfr., iv, 58. |
| <i>goniochila</i> Pfr., iv, 58. | <i>ptychostyla</i> Pfr. not Mart. |
| | <i>f. depressior</i> Pfr. |

Subgenus (?) *BULIMINOPSIS* Heude.

Buliminopsis HDE., Notes sur les Moll. Terrest. de la Vallée du Fleuve Bleu, p. 146, type *H. buliminus*.—*Conf.* v. Molldff., Nachr. d. m. Ges. 1886, p. 195.—*Rudens* HDE., t. c., p. 148. type *Funiculus rudens*.—*Pseudobuliminus* Gredl., SCHMACKER & BOETTGER, Nachr. D. M. Ges. 1891, p. 164.

Shell elevated conic, perforated, the spire acute, 7–8 whorls; aperture small, oblique, peristome expanded. Soft parts unknown.

A middle Chinese group of uncertain position. Möllendorff refers it to *Satsuma*, Ancy to *Buliminus*, while Heude and Gredler cut the Gordian knot by removing the species from both genera.

- | | |
|---|----------------------------------|
| G. <i>pseudobuliminus</i> Hde., iv, 31. | G. <i>incerta</i> Pfr. |
| <i>B. macrogonus</i> Anc. | <i>taivanica</i> Mldff., iv, 33. |
| G. <i>buliminoides</i> Hde., iv, 31. | G. <i>quaternarius</i> Hde. |
| <i>B. tropidophorus</i> Anc. | <i>borealis</i> Hde. on pl. |
| G. <i>buliminus</i> Hde., iv, 32. | G. <i>conoidea</i> Hde. |
| <i>B. helicopsis</i> Anc. | G. <i>doliolum</i> Gredl. |
| <i>v. pinguis</i> Anc. | <i>F. rudens</i> Hde. |
| G. <i>macroceramiformis</i> Dh. | |

Subgenus (?) *COLIOLUS* Tapparone-Canefri, 1887.

Ann. Mus. Civ. Genov. (2), iv, p. 131.—Manual of Conchology (2) vii, p. 87. Not *Coleolus* Hall, Paleont. N. Y. v, p. 184, 1879.

Shell elevated-conic, many (eleven) whorled, upper whorls spirally striate, the rest obliquely costulate and setigerous; apex obtuse, mamillar; base depressed; peristome reflexed below, margins distant, connected by a callus. Type *C. arfakiensis* Tap.-Can. vol. vii, p. 87.

Soft parts unknown. Inhabits New Guinea. This peculiar snail is considered an ally of *Trochomorphoides* by Tapparone-Canefri. Perhaps it may prove to belong to the Charopoid series.

Genus DORCASIA Gray, 1845.

Dorcasia GRAY, Zeitschr. f. Mal. 1845, p. 87, type *H. alexandri*; P. Z. S. 1847, p. 171.—BINNEY, Ann. N. Y. Acad. Sci. iii, p. 106, pl. 6, f. M (Dentition).—*Galaxias* (part) BECK, Index Moll., p. 42 (preoc.).—Cf. PFEFFER, Verh. Vereins f. naturwissensch. Unterhaltung zu Hamburg, vi, p. 118, 1887. Also SIMROTH & BOETTGER, Berichte d. Senckenb. Gesellsch. 1885, p. 16, pl. 1, f. 2 (as "*Bulimius* sp.").

Shell rather large and solid, glossy and unicolored; umbilicated, globose or depressed with rounded periphery, rather conoid low spire and deflexed last whorl. Aperture oblique or subhorizontal, rounded-truncate, toothless; the lip thickened, and reflexed at least below. Type *D. alexandri*. See pl. 38, figs. 6, 7, *D. alexandri* var. *rotundata*. Also *D. globulus*, pl. 38, fig. 8.

Jaw low, wide, slightly arcuate, *entirely smooth* (pl. 60, fig. 3, *D. alexandri*). Foot (of *alexandri*) short and broad, the sole very indistinctly tripartite; upper surface coarsely granular, the granules polygonal, subdivided; with no trace of pedal grooves; back with several longitudinal lines, obsolete toward head; facial grooves well marked and continuous from mantle to head, on both sides; tail more finely granose, obtuse behind, rounded above, without median groove. Mantle with small right and left body-lobes. Right eye-stalk retracted between branches of genitalia. Blind sack of the foot very long, lying free in body cavity.

Radula (pl. 60, fig. 6, *D. alexandri*) having mesocones only developed on middle and inner lateral teeth, the side cusps being represented by lateral extensions of the mesocones. On the outer laterals and marginals the ectocone becomes distinct and well developed. In *D. globulus* (pl. 51, fig. 3,) both median and lateral teeth are distinctly tricuspid. Marginals a simple modification of the laterals, the broad cutting-point trifid.

Genital system (frontispiece, fig. 3, *D. alexandri*) *without accessory organs of any kind*. Atrium very short. Penis long, larger, and abruptly bent toward the apex where the terminal, short retractor is inserted, its distal attachment being on the lung floor. *The vas deferens is not terminal*, but enters about one and one-half millim. below apex of penis. Vagina long; spermatheca on a long branchless duct, entering high on vagina.

The specimen of *D. alexandri* examined by me was kindly communicated by Dr. Simroth, and is the same one which supplied the data given in Ber. Senck. Ges. 1894. It is a badly preserved spirit example, and shows signs of immaturity.

The dentition of *D. globulus* differs from that of *alexandri* in the development of side cusps, which are represented in the latter by wide extensions of the mesocones. This is not an unusual variation. The smooth low jaw recalls *Helicophanta*, but the egg is apparently minute in *Dorcasia*, and we have from the mouth of the animal itself an emphatic contradiction of such a relationship, for the teeth are totally unlike the unicuspid type of the *Helicophanta* and *Ampelita* group.

The entire simplicity of the genital system shows *Dorcasia* to belong to the Euhaplogona, most living members of which are restricted to America, *Polygyra* being a leading genus. In this group of genera the penis bears neither epiphallus nor flagellum, the vagina or atrium have no dart sack or mucus glands, the duct of the spermatheca does not branch into a diverticulum. *Dorcasia* is, therefore, isolated among the Helices of Africa, Asia and Europe. It is interesting to note that many of its associates in the Cape fauna are equally so, and mainly belong to a much older fauna than that occupying these continents: *Aerope* has its allies only in Australia, Tasmania and New Zealand; *Trachycystis* (Pella) has the same geographic alliances; *Peripatus* has a similar, though wider, range; and many other Cape animals could be named which belong to an archaic fauna.

With Oriental snails of the type of *H. similaris* Fér. (*Eulotella*), these South Africans have no especial relations.

All of the species are from the South African zoological province, with the exception of the doubtful *D. votiva* Cr., from Madagascar, which differs from all the other species in being banded.

- | | |
|--|---------------------------------------|
| <i>D. rosacea</i> Müll., iii, 213. | <i>D. lucana</i> Müll., iii, 213. |
| <i>D. porphyrostoma</i> M. & P., viii, | <i>D. inhluzana</i> M. & P. |
| [262. | <i>D. usambarica</i> Crav., iii, 155. |
| <i>D. globulus</i> Müll., iii, 213. | <i>D. kraussi</i> Pfr., iv, 50. |
| <i>lucana</i> Lam., Fér., Rossm. | <i>D. cernua</i> Mts., viii, 263, |
| <i>D. namaquensis</i> M. & P., viii, | <i>D. alexandri</i> Gray, iii, 213. |
| [262. | v. <i>minor</i> Bttg., viii, 261. |
| <i>D. gypsina</i> Melv. & Pons., viii, | v. <i>rotundata</i> Mss., viii, 261. |
| [262. | <i>D. ? bulbosus</i> Mke., iii, 213. |
| <i>D. coagulum</i> Mts., viii, 263. | <i>D. ? votiva</i> Crosse, iii, 214. |

* * *

Belogona.

The series of genera following are characterized by the possession of organs wanting in all other Helices, viz. a muscular sack (or sacks) on atrium or vagina containing a calcareous needle or dag-

ger like "dart," and a gland or glands inserted upon or above this sack, the so-called "digitate glands" or mucus gland.

The presence of these organs was early noticed by European malacologists, but their significance has been only recently recognized. Semper in 1874 made two divisions of rib-jawed Helices, those genera with no accessory organs on genitalia, and those with such accessories; and in 1888 the writer used these features of the genitalia as diagnostic of various groups of Helices, elaborating the idea in a later paper (1892). Meantime Dr. H. von Ihering issued a paper of great merit, "Morphologie und Systematik des Genitalapparates von Helix," in which he proposes to restrict the family *Helicidae* to snails with *grooved or ribbed jaws and possessing the dart apparatus*, including therein as genera—*Xerophila*, *Fruticicola*, *Helix* (= *Pentatænina*), *Campylea*, *Gonostoma*, *Dorcasia* (= *Eulota*), and *Cochlostyla*. In the following pages I have adopted all of these groups as genera (although altering the names of most of them), and with the exception of *Campylea* and *Dorcasia*, they are retained with the limits defined by von Ihering. I need give no other expression of the high esteem in which I hold v. Ihering's work, than this use of it. It should be added, however, that many genera not noticed in von Ihering's paper, are now included in this group, some of which have ribbed, some smooth jaws. His family diagnosis of "*Helicidae*", therefore, does not cover nearly all the forms here grouped under *Belogona*.

The relationship of the *Belogona* to the *Epiphallogona* is discussed in the introductory portion of this volume. It remains to study the internal affinities of its numerous genera. It has been seen that the *Belogona* differ from *Epiphallogona* only by the addition of the dart apparatus, the penis having exactly the same morphology in the two groups. Now the simplest type of dart apparatus is that found in the genus *Helicostyla*, consisting of a sack containing a needle-like dart, without crown or blades, and a simple, mucus gland *upon the dart sack*, consisting of one layer of secreting cells arranged radially around a central space or duct (see pl. 54, fig. 7). This is, there can be no doubt, the primitive type of the dart apparatus, from which the various elaborate forms of darts and glands arose. No really primitive *Belogona* are now known to exist. *Helicostyla* is practically so in its dart arrangement, but it is divergent in the loss of the flagellum (present in its *Epiphallogonous* ancestors) and in the highly modified shell.

The anatomy of the European types of dart-bearing helices has been studied by Schmidt, Lehmann, Moquin-Tandon, and many

later authors. The American forms have been studied by W. G. Binney, but as many of his figures are of doubtful accuracy my conclusions have been based wholly upon fresh dissections. The West Indian genera are herein for the first time made known anatomically; and the forms of East Asia are partially known by the work of Semper, but largely by my own dissections. The great mass of data before me from these sources, has compelled me to reject von Ihering's phylogenetic scheme, and to offer the following arrangement:

BELOGONA EUADENIA. *Mucus gland one, inserted on dart sack or at its base; simple or divided, glandular, sacculated, globular or bulbous.*

BELOGONA SIPHONADENIA. *Mucus glands usually two or many, inserted on vagina; tubular or composed of tubular branches.*

Apparent exceptions to this arrangement are seen in *Helicigona quimperiana*, where the tubes are shortened into hollow, thin-walled sacks, and some Fruticicoloid forms with demonstrably degenerate genitalia. The first of these divisions will now be discussed:

BELOGONA EUADENIA.

This division of the Belogona, characterized by having mucus glands of typically glandular structure, in contradistinction to the tube-like glands of the *Siphonadenia*, is now distributed throughout Eastern Asia, outlying groups extending to New Guinea and the Solomon Is., and northward to Japan and Siberia. In America it occupies the Pacific slope from British Columbia to Argentina, with genera in the Greater Antilles. It is a significant fact that its area while in large part coincident with that of the *Epiphallogona* (*Hadra*, *Camena*, *Obba*, etc.) is over stepped on nearly all sides by the latter. Thus *Planispira* extends further west in India; *Thersites* (+ *Hadra*) and *Chloritis* extend beyond it southward to Australia; *Papina* has a far greater range throughout the "Melanesian Plateau"; and *Ganesella* follows the Euadenia to the confines imposed by rigorous climate in the north. And in the New World, again, while both *Euadenia* and *Epiphallogona* have a wide range in South America, the latter are universally dispersed throughout the Caribbees as well as the Greater Antilles, whilst the former came too late to follow them to the Caribbean chain. The inference is, of course, that the *Epiphallogona* are an older faunal element, and have had more time to take advantage of the various means of dispersal by which islands (especially continental islands) and continents have been peopled.

A single European genus, *Leucochroa*, is herein referred to the *Euadenia*; but it is a degenerate group in genitalia and jaw and may prove to belong to the *Siphonadenia*, in the vicinity of *Helicella* (*Xerophila*), which it resembles in the simple-lipped, chalky shell and the peculiar musculature. The American genus *Lysinoe* is also aberrant, differing from all other *Euadenia* in having three club-shaped mucus glands inserted on vagina, and in the doubling of the dart sack; but it differs from all *Siphonadenia* as well in having the mucus glands inserted one behind the others, instead of at the same level on the vagina. I have considered it a tangent from the *Epiphragmophora* circle. *Oxychona* is still imperfectly known.

The genera of this division may be tabulated as follows:

a. New World genera.

1. Dart sack 1, with subapical constriction, apex attached by a thread to vagina; mucus gland 2-lobed; jaw smooth; tail not serrate.
 - b. Middle and inner lateral teeth 1-cuspid, marginals 3-cuspid,
[CEPOLIS.
 - bb. All teeth with three *subequal* cusps, POLYMITA.
2. Dart sacks 2; mucus glands 3, on vagina; tail with serrate keel; jaw ribbed.
 - b. Teeth of normal type; shell subglobose, large, deep colored,
[LYSINOE.
 - bb. Teeth with wide middle and minute side cusps; shell trochoidal,
OXYCHONA.
3. Dart sack 1; mucus glands absent, jaw ribbed; shell discoidal with thin, simple and acute lip, GLYPTOSTOMA.
4. Dart sack 1; mucus gland single, club-shaped, bifid and bulbiferous, or 2 with flat glandular extremities adnate on vagina or d. s., EPIPHRAGMOPHORA.

aa. Old World genera.

1. Dart sack 1, well-developed.
 - b. Mucus gland single, globose, inserted on dart sack,
[HELICOSTYLA.
 - bb. Mucus gland acinose; shell bright colored, CHLORÆA.
 - bbb. Mucus gland divided, lobes sacculated, elongated,
EULOTA.
2. Dart sack wanting; jaw smooth; shell strong, chalky and white,
LEUCOCHROA.

Genus CEPOLIS Montfort, 1810.

= *Cepolis* Montf. + *Eurycampta* Mart. + *Jeanneretia* Pfr. + *Hemitrochus* Swains. + *Coryda*, *Dialeuca* and *Leptoloma* Alb. + *Histrio* and *Plagiptycha* Pfr. + *Cysticopsis* Mörch not Martens.

Shell globose-depressed or globose-conoid, umbilicate or imperforate, smoothish, rib-striate or spirally malleated; lip expanded (or simple and sharp), reflexed at columella, which is generally thickened with an oblique callus, sometimes a tooth; lip otherwise toothless but occasionally there is a callous fold within the mouth; varying from unicolored to conspicuously streaked or banded, the bands irregularly disposed. Type *C. cepa*, pl. 25, fig. 9. (See also pl. 56, figs. 1 to 9, and pl. 58, figs. 54 to 56).

Animal granulated above, without distinct dorsal grooves, facial furrows or tail-groove, the sole not tripartite except in color; mantle with small right and rudimentary left body-lappets. Right eye retracted between branches of genitalia.

Jaw high arched, with an obvious or slight median projection and sometimes a wide, vertical rib-like median convexity; *its surface smooth* or showing slight striæ (pl. 57, figs. 41 to 46).

Radula long, with comparatively few longitudinal rows of teeth (30. 1. 30 to 45. 1. 45). *Middle and lateral teeth having long, narrow basal plates, and short, broad middle cusps*, shorter than the basal plates, and with *no trace of side cusps*. Transition teeth developing the ectocone; marginal teeth tricuspid, *the ento- and meso-cones short*, coalescent at base, ectocone simple or bifid. (Pl. 57, figs. 40, 47 to 51).

Genitalia (pl. 52, figs. 12-16, 19, 21) characterized by a *long, slender penis* provided with a weak retractor or none, inserted low on penis and distally on the lung floor; *the apex of penis splitting into a long flagellum* and the *v. d.* Low on vagina or on atrium is borne a *long club-shaped dart sack, with constricted head*, which is bound by a string of connective tissue to base of vagina; at the base of dart sack the *glandular, flat, two-lobed, elongated mucus gland* is inserted. Spermatheca long, closely bound to upper end of uterus; *its duct very long, closely adherent to uterus*, convoluted on lower end of same, but free from vagina, near the base of which it is inserted. Notwithstanding the well developed dartsack, I found no dart in any of the numerous individuals of this genus examined.

Distribution, greater Antilles, Bahamas, Florida Keys.

See under *Plagioptycha* for notes on the fossil forms.

The prominent features of this group are (1) the smooth, high arched jaw with median projection, (2) the long radula with few longitudinal rows, middle and lateral teeth with long, narrow basal plates and short, broadly rounded mesocones, no side cusps, marginals with short ento+mesocones, (3) the weak or even lacking retractor of the long penis, the club-shaped dart sack and two-lobed mucus gland; long, unbranched spermatheca duct, etc.

The only near ally of *Cepolis* is the genus *Polymita*, which inhabits the same tract. The latter has the same type of jaw and genitalia, but differs in the radula with over twice as many longitudinal rows of peculiarly modified teeth, all of them bearing three nearly equal cusps. From the Californian and Mexican *Epiphragmophora* species *Cepolis* differs in the very characteristic form of the dart sack, the short inner cusps of the marginal teeth, the ribless jaw, etc.

Part of the species of this genus are ground snails with dull brownish shells, but little variegated, as in the sections *Cepolis*, *Jeanneretia*, *Eurycampta*, *Plagioptycha*; part are arboreal, and in these the shell is generally bright in color, often with a rich and beautiful banded or streaked pattern, *Coryda*, *Hemitrochus* and *Dialeuca* being of this sort. A parallel series of variations is seen in the Philippine Island *Cochlostylas*, where we have also arboreal and terrestrial forms.

This genus is remarkably homogeneous in characters of the soft anatomy, which offers no divergence of more than specific value throughout the entire group. I have given on plates 52 and 57 drawings representing the anatomy of a sufficient number of the sectional groups to allow any malacologist to judge for himself of the literal truth of this statement. The *shells* afford characters for several sectional divisions, of which it must be said that although the typical species are quite different, intermediate forms reduce the diagnostic sectional characters to a minimum. This intergradation has caused me to disregard the fact that former authors have distributed the elements of my genus *Cepolis* far and wide throughout the *Helix* series; and I venture to predict that any one having a fairly complete collection of the species will endorse the views here advanced if he will bring the species together and observe the transition forms uniting the various sections. *Cepolis* is bound to

Jeanneretia by *C. squamosa*, *subtussulcata*, etc.; *C. exdeflexa* is a transition between *Jeanneretia* and *Eurycampta*, and is not far from some of the *Plagiptychas*, while *nemoralina*, *filicosta* and *maynardi* bridge the gap between *Plagiptycha* and *Hemitrochus*.

I am unable to find in *Hemitrochus* and *Polymita* any general system or plan in the distribution of bands, such as occurs in the five-banded *Helices* of Europe or in the epiphallogonous groups of Asia and Australia. I believe that the color schemes of the arboreal West Indian forms have been independently evolved, with the exception of the supra-peripheral band, which may possibly be homologous with that of *Campylaea*, *Tachea*, etc.

A prominent feature in some species of this genus is the tooth within the mouth of the shell, marked by an external pit. A similar structure occurs in *Solaropsis*, *Planispira*, *Neocepolis*, etc., but it does not seem to be of generic or even subgeneric value in any group.

The sectional divisions are as follows :

{	Cepolis.	{	Plagiptycha.	
	Jeanneretia.		Cysticopsis.	
	Eurycampta.		Hemitrochus.	
			Coryda+Dialeuca.	

Section *Cepolis* Montf., 1810.

Cepolis MONTF., Conch. Syst. ii, p. 150 (type *nicolsinianum* Montf. = *cepa* Müll.); *Cepolum* MONTF., l. c. p. 151.

Shell rather solid and of moderate or large size, imperforate or umbilicate, compact, globose-depressed, opaque, striate or malleated, 2 or 3 banded, the spire low, conic or convex; whorls less than 5, the last abruptly deflexed in front, *having a pit below the periphery a short distance behind the lip*, which inside the shell appears as *a callous fold a short distance within the outer lip*. Aperture quite oblique, truncate-oval, the lip expanded; columellar lip reflexed, *armed inside with a compressed or entering tooth*. Type *C. cepa*, pl. 25, fig. 9.

Soft anatomy unknown. Distribution, Hayti.

Differs from *Jeanneretia* mainly in the stronger columellar tooth and the constant deep pit behind the lip forming a callous fold within the mouth.

C. cepa Müll., v, 93.
impressa Bly.
nicolsinianum

C. trizonalis Grat., v, 93.
 v. *trizonella* Pils., v, 94.
C. trizonaloides Brown, v. 95.
pinesoma Pils., v, 95.

Section *Jeanneretia* Pfr., 1877.

Jeanneretia PFR., Mal. Bl. xxiv, p. 7 ; Nomencl. Hel. Viv., p. 116,
 —PILSBRY, MAN. CONCH. v, p. 48. Cf. POEY, Memorias, pl. 6, f. 6.
 genitalia of *parraiana*.

Shell imperforate or umbilicate, globose-turbinate, light brown, generally with darker chestnut bands, two or three in number. *Whorls 5 to 6½, slowly widening, the last deflexed in front and constricted behind the lip*; aperture oblique, rounded-truncate; lip reflexed and thickened, the columellar margin straightened. Type *C. multistriata* Dh. (See pl. 58, figs. 54, 55, *C. parraiana*).

Jaw and radula unknown. Genitalia as in *Eurycampta* (pl. 52, fig. 21, *C. parraiana*, after Poey).

Distribution, Cuba ; one species, *C. squamosa*, is from Porto Rico ; they live under dead leaves and stones.

The group is allied to *Cepolis* and *Eurycampta*, its main distinctive features being the spirally lirate surface and the groove or constriction behind the reflexed lip.

C. multistriata Dh., v, 49.
circumtexta Fér.
vesica Lea.
bicincta Mke.
adjuncta Zgl.
 v. *pityonesica* Pfr., v, 49.
C. wrighti Gundl., v, 49.
C. dermatina Sh., v, 50.

C. angulifera Mart.
C. parraiana Orb., v, 50.
 v. *parallela* Poey, v, 51.
C. sagraiana Orb., v, 50.
C. subtussulcata Wright, v, 51.
C. squamosa Fér., v, 95.
macularia Lm.

Section *Eurycampta* Martens, 1860.

Eurycampta MART. in Alb., Die Hel., p. 127, type *H. bonplandi*.

Shell narrowly umbilicated, orbiculate convex, obliquely rugose-striate, with a satin like lustre ; brown, uniform or with 1 to 3 bands above, one or none below the rounded periphery. *Whorls 5 or less, the last unusually wide, deflexed in front. Aperture large, transverse, oval*; peristome expanded and lipped, reflexed below,

the columellar margin often callously thickened within; ends of lip somewhat approaching. Type *C. bonplandi*, pl. 58, fig. 56.

Animal as described for *C. alauda*, but lighter colored.

Jaw solid, high arched, smooth except for slight striæ in places. (pl. 52, fig. 18, *C. bonplandi*).

Radula (pl. 52, figs. 20, 22, *C. bonplandi*) long, the middle and lateral teeth with long basal plates and short, rounded mesocones, no side cusps. Transition teeth developing an ectocone (fig. 22, central with two adjacent laterals and two transition teeth). Marginals of the usual tricuspid type (fig. 20).

Genital system as in *Coryda*, etc., but the retractor muscle is stouter, flagellum and mucus glands longer (pl. 52, fig. 19, *C. bonplandi*).

C. bonplandi Lam., iv, 82.

C. poeyi Petit, iv, 83.

C. supertexta Pfr., iv, 82.

staminea Mke.

C. arcistria Pfr., iv, 82.

velutinata Bk.

C. exdeflexa Pils., v, 198.

C. bryanti Pfr., iv, 83.

deflexa Pfr. not Braun.

C. desidens Rang, iv, 82.

Section *Coryda* Albers, 1850.

Coryda ALB., Die Hel., p. 100, for *alauda* and varieties.—*Histrio* PFR., Mal. Bl., 1855, p. 185; 1877, p. 8, for *H. dennisoni*.—*Helicostyla* BECK, Index, p. 36, in part.

Shell depressed-globose, imperforate, *solid and strong, smooth, with deeply and abruptly deflexed last whorl*, very oblique, transversely oblong aperture, the lip expanded, thickened within, and having a conspicuous banded, obliquely streaked or dotted color pattern. Type *H. alauda* pl. 56, figs. 3, 4.

Animal of *H. alauda* blue-black, the sole light slate colored in the middle, not tripartite except in color. Foot long, granulated, without distinct longitudinal grooves on back and lacking facial grooves. Tail evenly and more finely granulated, acute behind. Mantle-edge thin, with a low right body-lappet and a minute left one. Right eye retracted between branches of genitalia.

Jaw (of *H. alauda* pl. 57, fig. 45) solid, highly arched, with a wide median projection, its surface entirely smooth.

Radula (of *H. alauda* pl. 57, fig. 49) long and narrow, with V-shaped rows according to the formula 24. 9. 1. 9. 24. Median teeth with long basal plates and short, broad mesocones, no side cusps.

Laterals similar but asymmetrical. Marginals developing a stout ectocone, and on the outer ones an entocone. The figure represents a middle tooth with 3 laterals and an inner and outer marginal.

Genital system with vestibule short; penis (pl. 52, fig. 13) very long and slender, without retractor, terminating in v. d. and a long flagellum. Vagina branching low into a very long and much twisted spermatheca duct which ends in a long spermatheca bound closely to top of uterus. Dart sack very large, dark colored, with a long fleshy white head, the apical portion separated by a constriction and united to base of uterus by a connective thread. Mucus glands two, long, leaf-like and glandular, uniting at their bases and inserted on the dart sack near its base. No dart found on the papilla in several specimens examined, which were of the "strobilus" variety (pl. 52, figs. 12, 13, *C. alauda*).

The species are few, and all from eastern Cuba except *H. circumornata* with its two slight color varieties from western Hayti. *H. dennisoni* is hardly more than a variety of *alauda*. The last named species is arboreal, and is frequently found living in the cargoes of bananas brought to Philadelphia and other eastern cities. Through the kindness of Mr. John Ponsonby I am able to fix at last the identity of the long lost *H. circumornata*, and the status of *vigiensis* and *stenostoma*.

C. alauda Fér., v, 42.

strobilus Fér.

avellana Fér.

purpuragula Lea.

mamilla Lea.

bizonalis Grat.

pudibunda Beck.

hebe Dh.

C. dennisoni Pfr., v, 44.

juliana Poey.

C. ovumreguli Lea, v, 44.

C. circumornata Fér., iv, 222.

v. *vigiensis* Weidl., v, 46!

v. *stenostoma* Pfr., v, 48!

C. lindoni Pfr., v, 45.

lindeni Pfr.

immersa Gundl.

C. bartlettiana Pfr., v, 45.

C. melanocephala Gundl., v, 46.

f. *perelevata* Pils.

C. nigropicta Arango, v, 47.

Section *Dialeuca* Albers, 1850.

Dialeuca ALB., Die Hel. 1850, p. 114 (for *H. nemoraloides*).—*Leptoloma* ALB.-MART., Die Hel. 1860, p. 136 (type *H. fuscocincta*).—W. G. BINN., ANN. N. Y. Acad. Sci., iii, p. 96, jaw and dentition of *fuscocincta*; p. 107, dentition of *gossei*.

Shell imperforate, rather thin, more or less *trochoidal*, varying from high and pyramidal to low trochiform; lip thin, slightly expanded, a little widened and reflexed at the columella. Type *C. nemoraloides*, pl. 56, fig. 5. (See also *C. fuscocincta*, pl. 56, fig. 6).

Animal light colored or dark as in *H. alauda*. Jaw, dentition, etc., also as in *Coryda* (pl. 57, figs. 43, 48, jaw and dentition of *C. platystyla*).

This section might well be united to *Coryda*, from which it differs only in distribution and the somewhat thinner shell. The typical *Dialeucas* are from Jamaica, but a few species are from Navassa (*H. gaussoini*), and the Cayman Is. (*streatori*, *caymanensis*); and the closely allied *H. phæogramma*, of which I have seen a specimen in Ponsonby's collection, is not yet located.

- | | |
|------------------------------------|---|
| <i>C. conspersula</i> Pfr., v, 38. | <i>C. nemoraloides</i> Ad., v, 40. |
| v. <i>fuscocincta</i> Ad., v, 39. | v. <i>pulchrior</i> Ad., v, 41. |
| v. <i>platystyla</i> Pfr., v, 39. | <i>gossei</i> (C. B. Ad.), Pfr., Rv. |
| v. <i>virginica</i> Ad., v, 39. | <i>C. gaussoini</i> Tryon, v, 197. |
| <i>C. subconica</i> Ad., v, 40. | <i>C. streatori</i> Pils., viii, 240. |
| <i>gossei</i> Pfr.! | <i>C. caymanensis</i> Mayn., viii, 241. |
| <i>C. jacobensis</i> Ad., v, 41. | <i>C. phæogramma</i> Pfr., v, 42. |
| <i>C. blandiana</i> Ad., v, 41. | |

Section *Hemitrochus* Swainson, 1840.

Hemitrochus Sw., Malacol., p. 331, type *H. hemustomus*=*H. varians*.—BINNEY, Terr. Moll., v, p. 174, and Ann. N. Y. Acad. Sci., iii, p. 90 (jaws and teeth of *variens*, *trocheli*, *gallopavonis*, *rufopiceata*, *graminicola*, *milleri*).—*Polytænia* MARTENS, Die Hel., p. 129, type *H. multifasciata*.—*Phædra* ALB., Die Hel., p. 100.

Shell globose-conoid or globose-depressed, *solid*, smooth or rib-striate, *opaque*, *variegated with bands or dots*, the umbilicus narrow or closed; last whorl slightly descending. Lip blunt, simple or expanded, *thickened within*, reflexed at columellar insertion. Type *C. varians*, pl. 56, figs. 1, 2.

Jaw highly arched, with a median projection and sometimes a median rib-like convexity (pl. 57, fig. 41, *C. varians*. Pl. 57, fig. 46, *C. milleri*).

Radula having long, narrow basal plates and broad, short central cusps without side cusps on median and lateral teeth. Marginals

with a large split inner cusp and a simple or bifid ectocone (pl. 57, figs. 50, 51, *C. varians*).

Genital system having a long, slender penis branching into v. d. and a long flagellum, and with a thread-like retractor attached low, and inserted distally on the lung floor. Spermatheca duct free below, but firmly bound to uterus above, with a long spermatheca and a spiral twist in the duct near base of uterus. Dart sack long; mucus glands two, flat and glandular, inserted at base of dart sack. Eye stalk retracted between branches of genitalia (pl. 52, fig. 14, *C. varians* Mke.).

The shell in this section differs but little from that of *Coryda* and *Dialeuca*; and while quite distinct from the typical forms of *Plagioptycha*, there are a number of species so intermediate in character that they may be placed as well in one as in the other group. Anatomically there are no differences of more than specific worth between these groups, unless the larger (though still very weak) penis retractor of *Hemitrochus* be considered such. Many of the species are excessively closely allied.

There are two groups of species: the Cuban, consisting of compact forms of the type of *H. cesticulus*; the Bahama group varying from globose-conical like *H. varians* to depressed and rib-striate, *H. maynardi*.

Species of Florida and Bahamas.

- | | |
|---|---|
| <i>C. varians</i> Mke., v, 24. | <i>C. gallopavonis</i> Val., v, 27. |
| <i>carnicolor</i> Pfr. | v. <i>calacaloides</i> Pils., v, 28. |
| <i>submeris</i> Migh. | <i>C. troscheli</i> Pfr., v, 28. |
| <i>rhodocheila</i> Binn. | <i>tenuicostata</i> Dkr. |
| <i>polychroa</i> Binn. | v. <i>calacala</i> Weinl., v, 29. |
| <i>hæmastomus</i> Sw. | <i>C. multifasciata</i> W. & M., v, 30. |
| <i>C. xanthophaës</i> Pils., viii, 242. | f. <i>polytæniata</i> Pils., v, 30. |
| <i>C. milleri</i> Pfr., v, 25. | <i>C. filicosta</i> Pfr., v, 30. |
| <i>C. constantior</i> Weinl., v, 26. | <i>C. brownii</i> Pils., v, 29. |
| <i>C. caribæa</i> Weinl., v, 26. | <i>C. maynardi</i> Pils., viii, 241. |

Cuban Species.

- | | |
|------------------------------------|-------------------------------------|
| <i>C. gilva</i> Fér., v, 31. | <i>C. fuscolabiata</i> Poey, v, 34. |
| <i>corrugata</i> Pfr. | <i>subfusca</i> Poey not Bk. |
| v. <i>tephrites</i> Morel., v, 31. | v. <i>morbida</i> Morel., v, 35. |

- | | |
|--------------------------------------|---|
| <i>C. lucipeta</i> Poey, v, 32. | <i>C. maculifera</i> Gut., v, 35. |
| <i>picturata</i> Poey not Ad. | <i>C. sauvallei</i> Arango, v, 37. |
| <i>lepida</i> Poey. | <i>C. comta</i> Gundl., v, 34. |
| <i>bellula</i> Poey. | <i>C. amplexa</i> Gundl., v, 35. |
| <i>penicillata</i> Poey not Gld. | <i>C. rufoapicata</i> Poey, v, 36. |
| <i>newcombiana</i> Poey. | <i>C. graminicola</i> C. B. Ad., v, 36. |
| v. <i>velasqueziana</i> Poey, v, 32. | |
| v. <i>cesticulus</i> Gundl., v, 33. | |

Section *Plagioptycha* Pfr., 1856.

Plagioptycha PFR., Mal. Bl., 1856, p. 135 (for *indistincta*, *albersiana*, *duelosiana*, *bahamensis*, *strumosa*, *loxodon*, *monodonta*).—MART. in Alb. Die Hel., p. 145 (type *H. loxodon*).—W. G. BINNEY, Ann. N. Y. Acad. Sci., iii, p. 95, jaws and dentition of *loxodon*, *albersiana*, *monodonta*, *duelosiana*, *diaphana*, *macroGLOSSA*.

Shell umbilicate or imperforate, *thin*, depressed-globose or depressed, the last whorl deflexed in front. Aperture transversely oblong or lunate; outer lip expanded or simple; *and either on the floor of the whorl within the mouth, or on the columellar lip, there is an oblique nodule or fold of callus*, sometimes reduced to a slight trace only. Type *C. loxodon* Pfr. (See pl. 56, figs. 8, 9, *C. duelosiana*).

Animal light colored, externally similar to *Hemitrochus*.

Jaw high arched, with a median projection (pl. 57, fig. 42, *C. salvatoris*).

Radula (pl. 57, fig. 47, *C. salvatoris*) similar to that of *Hemitrochus*, but with the cusps rather more acute.

Genital system as described for *Hemitrochus* (pl. 52, fig. 15, *C. salvatoris*).

Plagioptycha is probably nearest to the ancestral forms whence the modern sections of this genus arose. Its habits are terrestrial and the dentition is somewhat less abnormal than in *Coryda* and typical *Hemitrochus*. Moreover, characteristic forms of *Plagioptycha* are found in the Miocene Silex Beds of Tampa, Florida, (*H. latebrosa* Dall, *instrumosa* Dall), with other species (*H. crusta* and *H. diespiter* of Dall) which would probably be classed in the modern section *Eurycampta*, although it is obvious that these latter Miocene forms are more intermediate between *Eurycampta*, *Jeanneretia* and *Plagioptycha* than any living species. In the Miocene

we are evidently near the horizon where the paths of the various sections of the genus *Cepolis* diverged, although the better defined forms of the genus no doubt have older roots.

The species of *Plagioptycha* are numerous and especially characteristic of the Bahamas, extending south to Hayti and the Virgin Islands. In Miocene times they extended to the (then) island of Florida, but later became extinct there, for the present Floridian land shell fauna is not directly descended from that of the Miocene island. Some forms of *Plagioptycha* approach *Hemitrochus*, and others are near *Cysticopsis*, so that the grouping, as in many of these sectional divisions, is somewhat arbitrary.

Umbilicate species, the columellar lip expanded, not adnate to base
(Bahamas).

- | | |
|-------------------------------------|------------------------------------|
| <i>C. indistincta</i> Fér., v, 14. | <i>C. bahamensis</i> Pfr., v, 18. |
| v. <i>disculus</i> Dh., v, 15. | v. <i>holostoma</i> Pils., v, 18. |
| v. <i>chromochila</i> Pils., v, 15. | <i>C. sargenti</i> Bld., v, 18. |
| <i>C. strumosa</i> Pfr., v, 15. | <i>C. duclosiana</i> Fér., v, 19. |
| <i>C. rüsii</i> Pfr., v, 16. | v. <i>salvatoris</i> Pfr., v, 19. |
| <i>C. platonis</i> Pfr., v, 16. | v. <i>abacoensis</i> Mts., v, 20. |
| <i>C. albersiana</i> Pfr., v, 17. | <i>C. macroglossa</i> Pfr., v, 20. |
| <i>C. loxodon</i> Pfr., v, 17. | |

Imperforate species, with adnate columellar lip (Hayti to Virgin Is.).

- | | |
|-----------------------------------|---------------------------------------|
| <i>C. monodonta</i> Lea, v, 21. | <i>C. diaphana</i> Lam., v, 22. |
| v. <i>acuminata</i> Pfr., v, 21. | <i>C. santacruzensis</i> Pfr., v, 23. |
| <i>haitensis</i> W. & M., v, 21. | <i>C. phædra</i> Pfr., v, 23. |
| <i>C. nemoralina</i> Pet., v, 22. | <i>justi</i> Pfr. |
| f. <i>intensa</i> Pils., v, 22. | |

Section *Cysticopsis* Mörch, 1852.

Cysticopsis MÖRCH, Catal. Yoldi, p. 2 (proposed for *cubensis* Pfr. only).—Pilsbry, Man. Conch. v, p. 10, Cuban species.—Not *Cysticopsis* MARTENS, Die Hel. 1860, p. 144!

Shell globose-depressed, *thin*, semitranslucent, unicolored or spirally banded and dotted, the last whorl *not descending in front*; aperture large, broadly lunate, *the lip thin, not in the least expanded* or reflexed, dilated and appressed at the umbilical insertion. Type *C. cubensis* Pfr. pl. 56, fig. 7.

Animal light colored, otherwise as in *Coryda*. Jaw high arched, smooth, with a large median projection (pl. 57, fig. 44, *C. cubensis*).

Radula long. Teeth with long, narrow basal plates, the median and lateral teeth without side cusps, transition and marginal teeth with an ectocone, the meso- and ento-cones united into a large bifid cusp (pl. 57, fig. 40, *C. cubensis*). The teeth of *pemphigodes* figured by Binney are of the same type, but with shorter cusps.

Genitalia (of *C. cubensis*, pl. 52, fig. 16), as in *Hemitrochus*, except that I see but one lobe to the mucus gland; the very long penis is apparently without retractor. Possibly the second lobe of the mucus gland was inadvertently removed in my dissection.

Mörch, in his original publication of this group, mentioned only one species, *H. cubensis* Pfr. The authors of the second edition of *Die Heliceen* were therefore not justified in naming *H. tenuerrima* as type of *Cysticopsis*, and excluding *cubensis* from the roll of its members. On an earlier page of this work (p. 65), the writer has separated the Jamaica species formerly referred to this genus, and has shown them to belong to a separate genus, *Zaphysema*, near the *Sagda* group. The external features of the animal, its jaw, teeth and genitalia, all support this division.

Cysticopsis is allied on one side to the Cuban band-dotted forms of *Hemitrochus*, and on the other to the group of *Plagiptychas* like *diaphana*.

C. cubensis Pfr., v, 10.
lanieriana Orb.
trifusciella Beck.
pictella Beck.
N. pulchella Beck.
penicillata Gld., v, 33.
navula Morel., v, 34.
C. comes Poey, v, 11.
C. letranensis Pfr., v, 11.

C. auberi Orb., v, 11.
C. pemphigodes Pfr., v, 12.
pelliculata Poey.
C. lescaillei Gundl., v, 13.
C. luzi Arango, v, 13.
C. lassevillei Gundl., v, 14.
C. pellicula Fér., v, 14.
C. jaudenesi Cism., v, 14.
C. hjalmarsoni Pfr., v, 12.

Genus POLYMITA Beck, 1837.

Polymita BECK, Index Moll., p. 44 (*picta*, *globulosa*, *versicolor*, *carnicolor*).—GRAY, P. Z. S., 1847, p. 171, type *H. picta*.—MARTENS, Die Hel., 1860, p. 145, type *H. muscarum*.—W. G. BINNEY, Ann.

N. Y. Acad. Sci. iii, p. 89 (Jaw and dentition).—POEY, *Memorias sobre la Hist. Nat. Cuba*, ii, pl. 7, f. 5.—PILSBRY, *Man. Conch.*, v, p. 52.

Shell *subglobular, brilliantly colored*, rather thin but solid, imperforate; whorls few (about 4), the last but little deflexed; aperture rounded, slightly lunate, *the peristome simple, not expanded or reflexed* except at axis, where it is reflexed and adnate over the umbilical region; axis solid. Type *P. picta*, pl. 56, fig. 10.

Animal (of *P. picta*) black above, slaty below; evenly granulated throughout, without dorsal grooves, facial groove or foot margin, the tail rounded above, not grooved; sole not in the least divided, mantle edge thickened but without lobes.

Jaw arcuate, moderately solid, *smooth* (Pl. 51, fig. 8, *P. picta*).

Radula short and wide, *the teeth all of the same form, and in v-shaped rows*, formula about 85.1.85. Basal plates long and narrow; *cusps situated far backward, and projecting well over the posterior margin*; *all teeth tricuspid*, the three cusps united into a broad, tridentate gouge-shaped cutting edge. (Pl. 51, fig. 5, central with four lateral teeth; fig. 6, group of outer laterals; fig. 7, two extreme marginal teeth of *P. picta*).

Genital system (pl. 51, fig. 4, *P. picta*) altogether like that of *Cepolis*. The vagina is long, with a long stalked spermatheca; dart sack large, its head marked off by a constriction and united by connective tissue with the vagina; at root of d. s. there is a mucus gland composed of two oval, flat glandular lobes. Penis slender, with a long flagellum, and apparently no retractor muscle; eye-stalk retracted between branches of genitalia.

Distribution, Cuba. Habits arboreal.

The shell in this group resembles that of *Hemitrochus*, except that the lip is neither expanded nor thickened within. The genital system is entirely that of *Hemitrochus*. The radula is excessively peculiar in having the side cusps as long as the middle cusp and united with it to form a broad, tridentate gouge, all three cusps being subequally developed on all the teeth.

This type of radula may be compared with that of *Orthalicus*, *Oxychona*, *Papuina*, and especially with *Amphidromus*; all being arboreal genera, which have independently evolved the same general type of teeth.

- | | |
|-----------------------------|---------------------------------|
| P. picta Born, v, 53. | P. muscarum Lea., v, 54. |
| venusta Gmel. | globulosa Fér. |
| sulphureosa Morel., v, 54. | carnicolor Orb. |
| L. tiara Martyn. | v. subbrocheri Pils., v, 55. |
| P. versicolor Born., v, 54. | P. brocheri (Gut.) Pfr., v, 55. |
| ? pictoria Perry. | brocheri Arango. |
| ? cincta Perry. | |

Genus OXYCHONA Mörch, 1852.

Orychona MÖRCH, Cat. Yoldi, p. 14, type *H. bifasciata*.—PILSBRY, Man. of Conch., v, p. 128.—MARTENS, Biol. Centr. Amer., Moll., p. 152.—*Geotrochus*, *Leptoloma*, *Corasia*, *Axina* and *Euryeratera* of authors.—*Leptarionta* CROSSE & FISCHER, Moll. Mex. i, p. 253.

Shell rather shining, *thin and light colored*, with spiral brown bands, umbilicate or closed, the spire conic or depressed and merely convex, the last whorl varying from acutely keeled to subangular. *Surface smoothish*, often microscopically striate or granular. Aperture oblique, the lip expanded or reflexed, rather thin, not toothed. Type *O. bifasciata*, pl. 45, fig. 8. (See also pl. 45, figs. 1, 2, *O. costaricensis*. Pl. 45, figs. 3, 4, 5, *O. altispira*. Pl. 45, figs. 9, 10, *O. trigonostoma v. stolliana*.)

Animal (of *O. trigonostoma*, pl. 45, figs. 9, 10) quite elongated, the tail surmounted by a conspicuous serrate keel.

Jaw (of *O. bifasciata*, pl. 51, fig. 11), rather thin, arcuate, with no median projection, having about 17 unequal ribs distributed over its entire extent and denticulating the margin.

Radula (of *O. bifasciata*, pl. 51, fig. 10, central with 6 adjacent laterals, fig. 9, 7th to 13th laterals, with one marginal, and fig. below the latter, a lateral seen in profile) pavement-like, with v-shaped rows of nearly similar teeth. Centrals with an oblong squarish basal plate bearing one cusp springing from its middle, spreading into a spatulate form, and projecting far over the posterior end of of the basal plate on all sides. Laterals similar, but having the entocone indicated by a notch in the basal plate near its posterior angle, and bearing a minute basal ectocone. Outwardly, this ectocone increases in size, and becomes split on the marginal teeth, which are otherwise like the laterals.

Distribution, Brazil to Mexico. Habits arboreal, as far as known.

The prominent features of this group are the smooth, thin, light-colored and banded shell which is usually of a markedly trochiform contour, but sometimes depressed, the periphery angular; the ribbed jaw; the extremely peculiar radula, with enormously widened and enlarged middle cusps, and minute, basal side cusps. When the radula is torn, the teeth part readily along their lateral faces, but adhere in chain-like longitudinal rows.

The radula, as well as the jaw and shell, is comparable to that of *Papuina* (cf. p. 137, pl. 37, fig. 10), but although the superficial resemblance is great, the two are really totally distinct, the broad cusps of *Papuina* being formed by the united ento-, meso- and ectocones, whilst in *Oxychona* the mesocone only is modified, the side cusps becoming obsolete. *Polymita* also has a slightly similar but morphologically different dentition. The peculiar type of teeth in these three genera has evidently been independently evolved in each, from the usual tricuspid type. It seems to be correlated with arboreal habits. Compare also the radula of *Otostomus*.

The affinities of *Oxychona* are uncertain; but it will probably prove to be a member of the Belogona, distinguished from *Helix* by its *Papuina* or *Corasia* like shell, and the peculiar teeth. Probably in this group, as in *Papuina*, some species will be found to have a more normal type of dentition. The Mexican forms which have been placed in this group are still unknown anatomically, but the animal of *O. trigonostoma* has been figured with a toothed keel on the tail, such as occurs in the genus *Lysinoe*.

Messrs. Crosse & Fischer proposed the section *Leptarionta* for two species, *bicincta* and *flavescens*; but as they state that they had not seen *flavescens*, their group was evidently founded on *bicincta*, the first species described by them.

The first four species are from Brazil; the others are from Guatemala and Costa Rica to the province of Vera Cruz, E. Mexico.

- | | |
|---------------------------------------|---------------------------------------|
| <i>O. bifasciata</i> Burrow, v, 129. | <i>O. zhorquinensis</i> Ang., v, 132. |
| <i>pyramidella</i> Spix, Wagner. | <i>O. trigonostoma</i> Pfr., v, 132. |
| <i>bosciana</i> Fér. | f. <i>elevatoconica</i> C. & F. |
| <i>blanchetiana</i> Moric. | f. <i>lalliana</i> Tristr. |
| <i>O. lonchostoma</i> Mke., v, 130. | f. <i>salleana</i> Pfr. |
| <i>O. gyrina</i> Val., v, 131. | f. <i>obscura</i> C. & F. |
| <i>O. pileiformis</i> Moric., v, 131. | f. <i>intermedia</i> C. & F. |

- | | |
|-------------------------------|--------------------------------|
| O. trigonostoma Pfr., v, 132. | O. guillarmodi Shutt., v, 133. |
| <i>f. subunicolor</i> C. & F. | O. costaricensis Roth, v, 134. |
| <i>stolliana</i> Mts. | <i>f. virginea</i> Anc. |
| <i>f. freytagiana</i> Dohrn. | <i>f. steiniana</i> Anc. |
| O. altispira (Dohrn) Mts. | <i>f. boucardi</i> Ang. |
| O. bicincta Pfr., iv, 75. | O. adela Ang., v, 135. |

Genus LYSINOE H. & A. Adams, 1855.

Aglaja ALB., Die Hel., 1850, p. 107, sole species *H. ghiesbreghti*.
 —*Aglaja* ALB., v. MART., Die Hel., 1860, p. 122, in part, exclusive of "type" and all but first species. Not *Aglaja* Renier, 1804, Eschscholtz, 1825, or Swainson, 1827.—*Lysinoe*, H. & A. AD., Gen. Rec. Moll. ii, p. 203, for *ghiesbreghtii* and *hogoleuensis* (June, 1855).
 —v. MARTENS, Biol. Centr. Amer., Moll., p. 145.—*Odontura* FISCHER & CROSSE, Miss. Scient. Mex., Moll., pp. 211, 242, 1870, for *ghiesbreghti* and *eximia*.—*Humboldtiana* v. IHERING, Morphol. u. Syst. des Genitalapparates von Helix, in Zeitschr. f. wissenschaftl. Zoologie, liv, p. 172, 1892, type *H. humboldtiana*.

See for anatomy, FISCHER & CROSSE, *l. c.*; W. G. BINNEY, Bull. Mus. Comp. Zool., v, p. 336, pl. 2, f. 1. K.; v. MARTENS, *l. c.*, pl. 8, f. 4.

Shell large, globose or depressed globose, beset with granules and sometimes hairs, brownish or yellowish with dark spiral bands; umbilicus open or partly covered; aperture lunate, lip margins more or less reflexed, at least the columellar margin. Type *L. ghiesbreghti*, pl. 45, fig. 7. See also pl. 58, fig. 75, *L. humboldtiana* var. *badio-cincta*.

Animal large, coarsely granulose, the tail surmounted by a knobbed or serrate keel (pl. 45, fig. 7, *H. ghiesbreghti*).

Jaw arcuate, solid, with 6–11 spaced ribs (pl. 60, fig. 9, *L. eximia*).

Radula having unicuspid median teeth, the stout cusp shorter than the basal plates. Lateral teeth with a small ectocone. Marginals having a long oblique bifid inner cusp and a small ectocone, (pl. 60, fig. 5, *L. humboldtiana*).

Genital system having the retractor and epiphallus inserted at apex of the short penis; epiphallus continued in a long flagellum. Spermatheca duct varying from moderate to very long, without diverticulum. Vagina bearing two equal, symmetrically placed dart sacks, above the insertion of which three club-shaped mucous glands

are independently inserted on the vagina. Darts unknown. (Pl. 60, fig. 8, *L. ghiesbreghti*).

The three species present the same type of genitalia. The shell is similar to *Campylæa* or *Epiphragmophora*, but the doubling of the dart sack, and the number of the mucus glands, independently inserted on vagina, are features which can only be compared to the Xerophiloid and Fruticicoloid groups. The serrate keel of the tail is a curious feature of this group, but something like it occurs also in *Oxychona trigonostoma*, the internal anatomy of which is unknown. The jaw and teeth of *Lysinoe* are of the normal *Helix* form. Distribution, Southern Texas (*humboldtiana*) to Guatemala and Honduras (*ghiesbreghti*).

The name *Aglaja* Alb. is thrice preoccupied in zoology. *Lysinoe* was proposed for two species, the second of which, *Helix hogolensis* Le Guill., belongs to the prior genus *Rhyssota* Alb. We therefore follow von Martens' excellent precedent in considering *H. ghiesbreghti* the type of *Lysinoe*. *Helix humboldtiana* agrees entirely with *ghiesbreghti* in anatomy, so the sectional name, *Humboldtiana* v. Iher., becomes a synonym. *Odontura* is preoccupied.

<i>L. ghiesbreghti</i> Nyst., iv, 75.	<i>L. humboldtiana</i> Fér., iv, 260.
<i>f. subaurantia</i> , v. Mart.	v. <i>hegewischi</i> v. Mart.
<i>f. strubelli</i> Bttg.	v. <i>högiana</i> v. Mart.
<i>f. fulvostraminea</i> , v. Mart.	v. <i>buffoniana</i> Pfr.
<i>f. bizona</i> , v. Mart.	<i>matronula</i> Uhde.
<i>f. rufozonata</i> v. Mart.	v. <i>badiocincta</i> Wieg.
<i>L. eximia</i> Pfr., iv, 75.	
v. <i>stolli</i> , v. Mart.	

Genus GLYPTOSTOMA Bland & Binney, 1873.

Glyptostoma BLD. & W. G. B., Proc. Acad. Nat. Sci., Phila., 1873, p. 244 (June 3, 1873). See for anatomy, BINNEY, *t.c.* pl. 1, f. 1, 3; Am. Journ. Conch., vii, p. 190, pl. 17, f. 3, 4; Proc. Acad., Phila., 1875, p. 219, pl. 16, f. 4, pl. 13, f. 6, and 1876, p. 190, pl. 6, f. H.; Terr. Moll., v, p. 373, pl. 14, f. D.

Shall discoidal with slightly convex spire of about 6 whorls and broadly open umbilicus showing all the whorls; smoothish, dark and opaque; last whorl rather tubular, hardly descending in front. Aperture round-lunar, oblique, *the lip simple and acute*, neither

thickened nor expanded, margins approaching; *parietal wall densely spirally striated*. Type *G. newberryanum*, pl. 31, figs. 36, 37.

Jaw low, wide, slightly arcuate, without median projection, with about 15 ribs extending nearly to the ends. (Pl. 31, fig. 38.) Radula long and narrow, formula 30.17.1.17.30; basal plates of median and lateral teeth long, the mesocones about the same length, side cutting points developed. Marginal teeth with shortened basal plates, the inner cusp rather short and stout, ectocone small (pl. 31, fig. 40, middle with 1st lateral, 23d, 24th, 25th, 37th and 47th marginal teeth).

Genitalia (pl. 31, fig. 39) characterized by a stumpy penis with short, obtuse flagellum; dart sack obsolete or absent, but one club-shaped mucus gland, like that of *Epiphragmophora fidelis* present; spermatheca duct long, bound to oviduct, but free above and below.

A monotypic genus, allied to *Epiphragmophora*, but differing in the shell, which has much the form of the typical *Zonites* or *Patula*, in the wide many-ribbed jaw, and in the genital system, which apparently lacks a dart sack, although the mucus gland is retained. Further examination is needed, to ascertain whether any trace of the dart sack is present, for I suspect this will prove to be the case. The single species is common around San Diego, on southerly exposed hill-sides under rocks.

G. newberryanum W. G. B., iii, 110. Los Angeles, Cal., to Todos Santos Bay, L. Cal.

Genus EPIPHRAGMOPHORA Döring, 1875.

Epiphragmophora DORING, Bol. Acad. Nacional de Ciencias Cordova i, p. 446, for *H. hieronymi* and *H. cuyana*. + *Angrandiella* ANCEY, Conchologists' Exchange, i, p. 20, Nov. 1886, type *H. angrandi*. + *Pæcilostola* ANC., l. c., type *H. farrisi* (not *Pæcilostola* Stål, 1870, Hemiptera, *Pæcilostola* Chaud., 1871, Coleoptera, or *Pæcilostolus* Günth., 1863, Reptilia) = *Pilsbrya* ANC., t. c., p. 54, Apr., 1887, same type. + *Helminthoglypta* ANC., Conch. Exch., i, p. 76, June, 1887, type *H. tudiculata*. + *Micrarionta* ANC., Le Naturaliste, Dec., 1880, p. 334, type *H. facta*. + *Aglaia* of American authors, not Albers. + *Arionta* of authors, not Leach + *Lysinoe* PILS., check list, not H. & A. Adams + *Campylæa* (American species) v. IHERING, Morphol. u. Syst., not of Beck. + *Euparypha* of American authors, not Hartmann.

?+ *Cælospira* ANC., Conch. Exch., i, p. 20, type *H. macneili* (not *Cælospira* Hall, 1858, Brachiopoda)=*Averellia* ANC., l. c., p. 54, Apr., 1887, same type. + *Trichodiscus* STREBEL, Beitr. Mex. Land- und Süßw.-Conch., iv, p. 32, 1880 (not of Ehrenberg, Infusoria)=*Trichodiscina* v. MARTENS, Biol. Centr. Amer. Moll., p. 133, March, 1892; type *H. coactiliata*.

See for anatomy W. G. Binney, Terr. Moll., vol. v (figures not always reliable!).—Semper, Reisen, etc., p. 242.—Döring, Bol. Acad. Nac. Sci., Cordova, i, and Estudios Sist. y Anat. sobre los Mol. pulm. de los poises del Plata, Periodico Zool., i, 1875, p. 129-204.—Strebel & Pfeffer, Beitr. Mex. Moll., pt. iv.—HEYNE-MANN, Mal. Bl., xv, pl. iv, fig. 4.

Shell varying from globose to subdiscoidal, rarely keeled, umbilicate or imperforate, with 4 to 7 whorls. Surface generally decussated, malleated or hirsute; the texture varying from corneous to chalky; generally variegated, having a suprapraperipheral band, sometimes 3-banded. Aperture lunar, the lip expanded or reflexed, dilated at columellar insertion, toothless; but a few species have a columellar nodule or internal plicæ. Type *E. hieronymi* Döring, pl. 59, fig. 77. (See also pl. 58, figs. 57 to 74).

Animal granulated as usual, with a pair of dorsal grooves and no distinct facial grooves, the tail rounded above, not keeled nor grooved. Sole undivided (pl. 45, fig. 6, *E. fidelis*; pl. 59, fig. 76, *E. nickliniana*, showing atrium extruded, and the characteristic granulation of foot, not well shown in the fig. of *E. fidelis*). Right eye retractor passes between branches of genitalia.

Jaw arched, with 3 to 8 stout ribs denticulating the margins (pl. 59, fig. 78, *E. semiclausa*; fig. 80, *areolata*; fig. 83 *nickliniana*; fig. 84, *fidelis*; fig. 85, *arrosa*; pl. 52, fig. 17, *E. cordovana*).

Radula characterized by median and lateral teeth without side cusps; marginals with the entocone+mesocone forming a long compound cusp, ectocone simple, never bifid. (Pl 60, fig. 10, *E. fidelis*. Fig. 7, *E. nickliniana*. Fig. 4, *E. areolata*).

Genitalia characterized by a slender penis continued in an epiphallus which bears the retractor; flagellum present. Dart sack short, its apex neither constricted nor attached, containing a two-edged dart, pl. 59, fig. 82, *E. mormonum*. Mucus gland either (1) single and club-shaped, seated on dart sack, pl. 59, fig. 81, or (2) single but dividing above into two bulb-bearing branches, pl. 59,

figs. 79, 87, or (3) double and glandular with threadlike ducts inserted at root of dart sack, one gland bound to dart sack, one to vestibule or base of penis, pl. 59, fig. 89, glands torn from their attachments. The spermatheca is globose, its duct often bearing a diverticulum.

Distribution, British Columbia southward to Argentina, mainly confined to the Pacific drainage, but spreading to the Gulf slope in Central America.

The genus *Epiphragmophora*, while allied to the *Helices* of Japan, is distinguished from them by the non-sacculated mucus glands and some shell characters. It is also allied to *Cepolis*, a West Indian genus which is characterized by its flat, two-parted mucus gland, peculiarly formed dart sack attached at apex to vagina, and ribless jaw. The middle American genus *Lysinoe* is similar to *Epiphragmophora* in features of the shell, but differs widely in the duplication of the dart sack (elsewhere developed only in *Hygromia* and *Helicella*), in the three club-shaped mucus glands independently inserted on the vagina, and in the serrate keel of the tail. A still nearer ally of *Epiphragmophora* is *Glyptostoma*, characterized by the simple acute lip of the peculiar shell, and the decadence of the dart sack.

The diverticulum of the spermatheca duct is present or absent in closely allied species, just as we find it in other genera. The shell varies so much that no generic diagnosis can be framed from it alone, which would cover all forms of *Epiphragmophora* and still exclude species of other groups. This difficulty is not encountered when we diagnose from the soft anatomy, which presents extremely characteristic and readily recognized features.

Dr. von Ihering, in his essay on *Helix*, refers this New World series to *Campylaea*; but as the other groups studied by him belong to the *Belogona siphonadenia* of my arrangement, he was not aware of the value of the characters upon which the *Belogona* are split into two great groups, and his knowledge of the American forms was wholly second-hand—from *figures*, not *dissections*. I feel confident that if v. Ihering had actually dissected American and East Asiatic types, he would have taken a different view, and one more in accordance with the opinions of Semper and the writer.

The members of this genus have hitherto been placed in *Arionta*, *Euparypha* and *Aglaia* by American authors. Semper, as long ago as 1880 (*Reisen im Archip. Phil.* (2) iii, Landmoll., p. 245), emphat

ically stated his belief that the American should be separated from the European "Ariontas;" and my own studies have converted me to the same opinion, although before my dissections were begun, I had thought otherwise. It is sufficient to say here that in the American, as in the East Asiatic types of belogonous Helices, the mucus glands are globular or flat bodies of glandular texture, inserted upon the dart sack or at its base; in the European forms these glands are always tubes of equal diameter throughout their length, and inserted upon the vagina above the dart sack. If my division of the belogonous Helices upon this character be correct, *Helix*, *Helicigona* (-*Campylaea*+*Arionta vera*), *Fruticicola*, *Xerophila* etc., are all more nearly allied to each other than any European Helices are to the American Ariontas, so-called.

The American types are closely allied to the large Helices of Japan and China in anatomical features. The resemblance in shell characters of the Californian and European species is astonishing, but I do not doubt that it is due to purely secondary modification, which has moulded the shells to a deceptive likeness, but left unchanged the genitalia to tell more faithfully the story of their lineage.

Synopsis of Sections of Epiphragmophora.

Although not nearly so homogeneous a group as Cepolis, *Helix* or *Helicigona* in anatomy, this genus exhibits but little modification in shell characters. The sections here admitted, although natural groups, have but little systematic rank. *Averellia* and *Trichodiscina* are not sufficiently known anatomically for us to be certain that they belong here, but the probabilities are strong that they do.

**South American forms.*

Section EPIPHRAGMOPHORA Döring. Shell umbilicate, brown, calcareous, with one suprapraperipheral band, peristome expanded, nearly circular. *Epiphragm solid, calcareous*; jaw four ribbed; dart sack lengthened, with two globose, stalked mucus glands; spermatheca short-stalked. Type *H. hieronymi*, pl. 59, fig. 77; (see also *E. cuyana*, pl. 58, figs. 68, 69.)

Section PILSBRYA Ancey. Shell imperforate or umbilicate, malleated, similar to that of Helminthoglypta. Epiphragm membranous. jaw 4-5 ribbed (pl. 59, fig. 78, *E. semiclausula*); median

and lateral teeth without side cusps; marginals tricuspid; dart biangulate; mucus glands as in Epiphragmophora. Type *E. farrisi*, pl. 58, figs. 58, 59. See also *E. petasensis*, pl. 58, figs. 60, 61.

We regret to say that this group is not well distinguished from the preceding.

Section ANGRANDIELLA Anc. Shell depressed, umbilicated, with a toothlike prominence within the basal lip, marked by an external pit. Type *E. angrandi*, pl. 58, fig. 57.

***Central American and Mexican forms.*

Section AVERELLIA Ancy. Shell discoidal with concave spire and wide umbilicus, hirsute, the last whorl deeply descending in front; scrobiculate behind the aperture above and below; aperture subhorizontal, biplicate within, peristome narrowly expanded. Type *E. macneili* Crosse.

Section TRICHODISCINA Martens. Shell depressed, with open umbilicus and deflexed last whorl, granulate and hairy; aperture small, oblique or subhorizontal, toothless, the lip expanded. Jaw ribbed (pl. 52, fig. 17, *E. cordovana*). Type *E. coactiliata*, pl. 58, figs. 70, 71.

****North American forms.*

Section MICRARIONTA Ancy. Shell globose or globose depressed, one or many banded, the bands sometimes interrupted; substance rather calcareous. Mucus glands two, with threadlike ducts, one lengthened, adherent to and spread upon the vagina or base of penis, its duct entering vagina at root of dart sack; the other shorter, usually adherent to dart sack, on base of which its duct enters. Radula with rather short basal plate and wide mesocones, no ectocones on middle and lateral teeth. Marginals with a sub-bifid inner and simple outer cusp (pl. 60, fig. 4, *areolata*). See pl. 59, figs. 89, *E. areolata*. Type *E. facta gabbi*, pl. 58, figs. 73, 74. (See also *E. areolata*, pl. 58, figs. 66, 67.)

Section HELMINTHOGLYPTA Ancy. Shell globose or depressed, its surface either simply striated, decussated or malleated. Mucus gland one, split into two bulb-bearing branches, and inserted on the dart sack. (Pl. 59, fig. 47, *E. arrosa*; fig. 87, *E. traskii* v. *cayamensis*; fig. 88, *E. nickliniana*). Radula with basal plates longer than cusps of median teeth, middle and lateral teeth without side

cusps, marginals with a bifid inner and simple outer cusp (pl. 60, fig. 7, *E. nickliniana*). Type *E. tudiculata*, pl. 58, figs. 62, 63.

Section MONADENIA Pilsbry. Shell with depressed body whorl, often more or less keeled or angular, the spire either low or conical. Surface with growth striæ. Mucus gland one, undivided, club-shaped, its terminal portion glandular, and inserted on the dart sack. (Pl. 59, fig. 81, *E. fidelis*; pl. 59, figs. 82, 86, *E. mormonum*). Radula with no side cusps on middle, lateral or transition teeth; marginals with bifid inner and simple outer cusp (pl. 60, fig. 10, *E. fidelis*.) Type *E. fidelis*, pl. 58, fig. 72. See also pl. 58, figs. 64, 65, *E. mormonum*.

SOUTH AMERICAN SPECIES. Epiphragmophora + Pilsbrya.

- | | |
|--|---|
| <i>E. alsophila</i> Phil., iv, 78. | <i>E. higginsii</i> Pfr., iv, 79. |
| <i>E. audouini</i> Orb., iv, 81. | <i>farrisi</i> Hig., not Pfr. |
| v. <i>oresigena</i> Orb. | <i>E. huancensis</i> Ph., iv, 79. |
| <i>E. claromphalos</i> Dev. & Hpe., iv, 80. | <i>E. jaspidea</i> Pfr., iv, 79. |
| v. <i>mesomphalos</i> Mor. | <i>platysoma</i> Pils., vi, 104. |
| <i>E. clausomphalos</i> Dev. & Hpe., iv, 78. | <i>E. macasi</i> Higg., iv, 81. |
| | <i>E. monographa</i> Dör. |
| <i>E. cuyana</i> Strob., iv, 78. | <i>E. patasensis</i> Pfr., iv, 81. |
| <i>E. diluta</i> Pfr., iv, 80. | <i>f. minor</i> Pfr. |
| <i>E. estella</i> Orb., iv, 78. | <i>E. pelliscubri</i> Ph., iv, 80. |
| v. <i>tucumanensis</i> Dör., iv, 78. | <i>E. semiclausula</i> Mts., iv, 80. |
| <i>E. farrisi</i> Pfr., iv, 77. | <i>E. trenquellionis</i> Grat., iv, 82. |
| <i>E. gueinzii</i> Pfr. | <i>E. trigrammephora</i> Orb., iv, 80. |
| <i>E. hidalgonis</i> Dör. | <i>E. tschudiana</i> Ph., iv, 77. |
| <i>E. hieronymi</i> Dör., iv, 78. | <i>E. yocotulana</i> Dör., iv, 81. |

(Shell depressed, umbilicate, with a tooth within the basal lip.
Angrandiella.)

- E. angrandi* Morel., v, 96. Peru.

MIDDLE AMERICAN SPECIES.

(Shell hirsute, depressed, with large umbilicus, 2-grooved behind lip and 2-plicate within. Averellia.)

- E. macneili* Crosse, v, 96. Costa Rica.

(Shell depressed, subdiscoidal, with wide umbilicus; hirsute. *S.-E.*
Mexico, Cent. Amer. Trichodiscina.)

- | | |
|---------------------------------|-------------------------------------|
| E. coactiliata Fér., iii, 49. | E. suturalis Pfr., iii, 49. |
| <i>teniata</i> Nyst. | v. <i>pressula</i> Morel., iii, 50. |
| <i>nystiana</i> Pfr. | <i>almonite</i> Tristr. |
| <i>bridgesi</i> Try., not Newc. | <i>almoniteana</i> F. & C. |
| <i>parkeri</i> Tryon. | E. oajacensis Koch, iii, 50. |
| E. cordovana Pfr., iii, 49. | E. sumichrasti C. & F., iii, |
| ? <i>obsita</i> Pfr. | E. sargi C. & F., iv, 80. [184. |

NORTH AMERICAN SPECIES.

(Shell with conic or low spire, often keeled or angular. Monadenia.)

- | | |
|----------------------------------|--------------------------------------|
| E. fidelis Gray, iv, 69. | E. mormonum Pfr., iv, 70. |
| <i>nuttalliana</i> Lea. | v. <i>hillebrandi</i> Newc., iv, 70. |
| <i>f. minor</i> W. G. B. | E. circumcarinata Stearns, iv, 70. |
| <i>f. flava</i> Hemph. | |
| <i>f. subcarinata</i> Hemph. | |
| v. <i>infumata</i> Gld., iv, 70. | |

(Shell globose or depressed, smooth, malleated or granose, not keeled.
Helminthoglypta.)

- | | |
|--------------------------------|--------------------------------------|
| E. dupetithoursi Dh., iv, 71. | E. ellipsostoma Pilsbry. |
| <i>oregonensis</i> Lea. | E. carpenteri Newc., iv, 71. |
| E. sequoicola Coop., iv, 71. | <i>indioensis</i> Yates. |
| E. traskii Newc., iv, 71. | <i>remondii</i> Gabb, not Tryon. |
| <i>franki</i> Coop., err. typ. | E. coloradoensis Stearns, viii, 225. |
| v. <i>proles</i> Hemph. | E. magdalenensis Strns, viii, 226. |
| v. <i>cuyamacensis</i> Hemph. | E. rowellii Newc., iv, 72. |
| v. <i>tularensis</i> Hemph. | <i>lohrii</i> Gabb. |

* * *

- | | |
|-------------------------------------|--------------------------------------|
| E. exarata Pfr., iv, 73. | E. californiensis Lea. |
| E. arrosa Gld., iv, 72. | v. <i>ramentosa</i> Gld., iv, 73. |
| <i>æruginea</i> Gld. | <i>reticulata</i> Pfr. |
| <i>f. obscura</i> Pils. | <i>f. bridgesii</i> Newc. |
| <i>f. holderiana</i> Coop. | <i>parkeri</i> Tryon. |
| <i>f. stiversiana</i> Coop. | v. <i>diabloensis</i> Coop., iv, 74. |
| E. californiensis Lea, iv, 119. | v. <i>contracostæ</i> Pils. |
| <i>vineta</i> Val. | E. ayresiana Newc., iv, 70. |
| v. <i>nickliniana</i> Lea., iv, 73. | E. tudiculata Binn., iv, 74. |
| <i>arboretorum</i> Val. | <i>f. cypreophila</i> Newc., iv, 75. |
| <i>f. anachoreta</i> W. G. B. | |

* * *

E. trypanomphala Pfr.

E. rémondi Tryon.

verrilli Anc. C. Ex., ii, 63.

(*Shell globose or depressed, rather cretaceous. Micrarionta.*)

E. gabbi Newc., iv, 77.

E. ruficincta Newc., iv, 72.

v. facta Newc., iv, 77.

*

*

*

E. intereisa W. G. B., iv, 74.

E. stearnsiana Gabb, iv, 119.

crebristriata Newc.

E. tryoni Newc., iii, 229.

f. albida Hemph.

E. veitchii Newc., iii, 228.

f. callojunctis Pils.

E. areolata Sowb., iii, 228.

v. redimita W. G. B., iv, 74.

canescens Ad. & Rv., iii, 214.

f. castanea Hemph.

f. exanimata Coop.

E. kelleitii Fbs., iv, 119.

E. levis Pfr., iii, 228.

f. multilineata Hemph.

E. pandoræ Fbs., iii, 228.

f. castanea Hemph.

damascenus Gld.

Genus EULOTA Hartmann.

= *Eulota* HARTM. 1842, + *Thysanota*, *Plectotropis* and *Aegista* ALB. 1860, + *Armandia* ANC. 1883 and *Pseudiberus* ANC., + *Cathaica* MLLDFF. 1884, + *Euhadra* PILS. 1890, + *Dorcasia*, *Hadra* and *Camæna* of some authors.

Shell usually umbilicated, dextral or sinistral, varying from globose to depressed or lens-shaped, thin or solid, unicolored or few banded; surface striated, often with spiral lines. Aperture lunate or angular, the outer and basal lips generally expanded, columellar lip dilated. Type *E. fruticum*, pl. 55, figs. 1, 2, 3, 4. (See also pl. 64, all figures except 7, 10-12.)

Animal with feebly tripartite sole, small right and left body-lobes on mantel, a pair of dorsal grooves, and very weakly indicated facial grooves or none; sides of foot granulated as in *Helix s. str.*, tail with an ill-defined central line or none. Right eye retractor passing between branches of genitalia (or in sinistral species the left one).

Jaw arcuate, with 3 to 12 ribs dentating the concave margin (pl. 65).

Radula normal, the mesocones about as long as basal-plates, side-cusps weakly developed or represented by a lateral continuation of main cutting-points; marginals with the inner cusp bipid (ento-*plus* meso-cone), ectocone simple or bifid (pl. 65).

Genitalia : penis extending into an epiphallus which sometimes has, sometimes has not, a flagellum. Dart sack containing a round or flat dart, and either borne on atrium or higher on vagina. *Mucus gland inserted on dart sack, or on an empty accessory sack communicating with dart sack*, and consisting of one or many *sacculated or glandular, long or oval branches, bound closely together and to the dart sack*. Spermatheca oval or globose, on rather a long duct, which lacks diverticulum.

Distribution, Central Europe (one species) to Japan, south to E. Indian Archipelago. Especially characteristic of Eastern Asia.

This genus differs widely from the European dart-bearing *Helices* in having the one (often many-branched) mucus gland *inserted on the dart sack* or on an accessory empty sack, and in the structure of the gland itself. It is more closely allied to the American genera *Epiphragmophora* and *Cepolis* in the structure of the mucus gland.

Eulota, as herein understood, comprises a great variety of shell-forms and a large number of species; including, indeed, a considerable majority of the East Asiatic *Helices*. As in all other large genera of *Helices*, the shell varies from globular to lens-shaped (see introduction to this volume); and the several stages of contour, each represented by a numerous progeny of species, have received names which some writers use in a subgeneric, some in a generic, sense. In my opinion, the former is the more philosophic view, as the shell characters fade from one group to another, offering no sharp line of demarkation throughout the genus, so far as I can see. As to the anatomy, my dissections (a part of which are shown on plates 65, 66) tell clearly that no grounds for a division of the group into two or more genera can be based thereon, unless the forms in which the penis has a flagellum be separated generically from those lacking this organ; and I do not think it likely that the examination of more material will add to the value of this feature. At all events, I can find no character of shell or soft parts correlated with it, and we are hardly justified in founding a genus on a single peculiarity, unless it be one of greater value than this. Like *Polygyra*, *Thersites* or *Helix s. str.*, the various anatomical divergencies, except as to the flagellum, are fully covered by intermediate forms; although, as a whole, the genus is characterized by well-marked peculiarities which would enable one to identify any of its members by an inspection of the genital system alone, without the assistance of shell characters.

The main anatomical divergencies may be tabulated as follows for the species now known anatomically :

<i>Species.</i>	<i>Flagellum.</i>	<i>Dart sack.</i>	<i>Acces. sack.</i>	<i>Mucus gl. branches</i>
<i>Eulota fruticum</i> ,	absent, inserted high,	present, 2 to 4.		
<i>Eulotella similis</i> ,	absent, inserted low,	absent, 2 sub-dividing.		
<i>Eulotella fodiens</i> ,	absent, inserted high,	present, 2 sub-dividing.		
<i>Eulotella duplocincta</i>	absent, inserted low,	present, 6 sub-dividing.		
<i>Acusta tourannensis</i> ,	absent, inserted high,	? sev'rl br'nces		
<i>Acusta ravida</i> ,	absent, inserted high,	present, sev'rl coal'sc'nt		
<i>Cathaica pyrrhizona</i> ,	absent, inserted low,	absent, many br'nces.		
<i>Cathaica przewalskii</i> ,	? inserted low,	? 2-branched.		
<i>Plectotropis vulv.</i>	present, inserted low,	absent, 2-branched.		
<i>Mastigeulota kiang.</i> ,	present, inserted low,	present, many br'nces.		
<i>Euhadra quæsitæ</i> ,	present, inserted low,	present, many.		
<i>Euhadra peliomph.</i>	present, inserted low,	present, many.		
<i>Euhadra brandti</i> ,	present, inserted low,	present, many.		

It will be noticed that *Plectotropis*, *Mastigeulota* and *Euhadra* possess a flagellum; the other sections lacking it, probably by degeneration, as this organ was, in all likelihood, present in the primitive Belogonous stock. Among the true *Helices* *Eremina* and *Euparypha* have also lost the flagellum, by a parallel process.

Section *Eulota* Hartmann, 1842.

Eulota HARTM., Erd- und Süsswasser-Gast. Schweiz, p. 179, type *H. fruticum*.—*Helicella* and *Fruticicola*, in part, of some authors.—*Bradybæna*, in part, BECK.—*Eulotella* MOUSSON (where?) of some authors, type *H. similis* Fér.—*Acusta* ALB., Die Hel., 1860, p. 56, type *H. ravida* Bens.

Shell globose-conoid or globose-depressed, umbilicated, rather thin, the surface smoothish, generally with minute spiral striæ; color varying from sub-translucent white to light brown or yellowish, often with a supra-peripheral band (rarely several bands). Whorls 5–6, convex, the last hardly descending in front. Aperture round-lunate, toothless; peristome thickened within and expanded, dilated at columellar insertion. Type *E. fruticum*, pl. 55, figs. 1, 2, 3, 4. (See also pl. 55, fig. 19, *E. similis*, and pl. 55, fig. 5, *E. duplocincta*).

Jaw arched, with 4–11 ribs denticulating the concave margin. (See pl. 65, fig. 4, *similis*; pl. 65, fig. 5, *duplocincta*; fig. 2, *ravida*).

Radula of *E. fruticum* having the median cusp of middle teeth as long as basal-plate, side cusps subobsolete. Laterals with longer mesocones. Marginals with long bifid inner and on the outer ones

bifid outer-cusps (pl. 65, fig. 3, *similaris*; pl. 65, fig. 6, *duplocincta*; pl. 65, fig. 1, *ravida*).

Genitalia (pl. 66, fig. 18, *E. fruticum*): penis short, swollen, passing into a long epiphallus which receives vas deferens and retractor, but *lacks flagellum*. Dart sack globose, containing a round, conical dart (pl. 66, fig. 19), and communicating at base with an empty accessory sack which bears the mucus glands; these consist of 2-4 oval glands, closely bound together, and flattened on their adjacent sides, their ducts uniting into one canal which opens into the accessory sack. Duct of spermatheca long, inserted high on vagina. (See also pl. 66, fig. 20, *E. similaris*; figs. 21, 22, 23, *E. ravida*; fig. 24; *E. fodiens*).

Distribution, middle Europe to China and the East Indies.

Eulota is here used for a considerable number of Oriental snails having essentially the organization of the European *E. fruticum*. The penis lacks flagellum; the dart sack generally bears an accessory empty sack into which the many- or few-lobed mucus gland empties; and the dart is round in section or but little flattened, the shell being rather globose with conoidal, though low, spire. *Eulotella* Mouss., a sectional name used by von Martens for *E. similaris*, offers no distinctive characters of much value, except the obsolescence of the accessory sack on the dart sack. *Acusta* differs only in the thinner shell with simple lip, the mucus glands being either as in *E. similaris* (*tourannensis*) or being more closely bound together into one compact mass which envelops accessory sack and part of the dart sack (*E. ravida*, pl. 66, fig. 21; also fig. 22, reverse view of *d. s.* with mucus gland, and fig. 23, mucus gland turned back from *d. s.*, showing its insertion on accessory sack). The jaw of *Acusta* (pl. 65, fig. 2, *ravida*) has 8 strong close ribs. The radula (pl. 65, fig. 1, *ravida*) is not unlike other Eulotas, but the ectocones of marginal teeth are not split. Should the Oriental species be held sectionally distinct from the European *E. fruticum* on account of their more elongated and multi-sacculate mucus glands, they may be separated under the names *Acusta* and *Eulotella*; but v. Möllendorff, certainly a high authority on Asiatic snails, does not think two names required for them, uniting the three groups in *Eulota*.

One species of this group, *E. similaris*, has an unusually wide geographic range, extending from middle and southern China to Penang, Java, Celebes, etc., in which regions it is apparently indigenous. By the unconscious intervention of commerce it has be-

come colonized in Japan (Yokohama, Nagasaki, etc.); Bengal; Reunion, Mauritius, Rodriguez, Seychelles; Sandwich Is. (Kauai); Ascension Island; Brazil (Rio Janeiro, Bahia, etc.); Barbados, etc. It has been reported also from Cuba, Porto Rico and Jamaica, but is not now known to exist in those islands. It has been said to be found wherever the coffee tree has been carried, but this theory seems to be unsupported. In many cases I have found that it follows the cultivation of sugar-cane, also of Oriental origin. This seems to be the case in Barbados, Brazil, Kauai and the Seychelles, where *E. similis* is commonly found on the borders of cane-fields.

- E. arundinetorum* Hde., iii, 207.
E. assimilaris Gredl.
E. assimilis Ad., iv, 48.
E. bactriana Hutt., iii, 212.
E. billeana Hde., iii, 209.
E. biteniata Mlldff., viii, 221.
E. bocageana Cr., vi, 112.
E. brardiana Pfr., iii, 210.
E. burtinii Dh., iv, 48.
E. cavimargo Mart.
E. carinifera Semp., viii, 220.
E. cestus Bens., iii, 206.
E. cinctoinflata Monss., iv, 47.
E. coreanica A. & R., iii, 220.
E. cremata Hde., iii, 207.
E. despecta Gray, iii, 211.
E. dichroa Pfr., iii, 208.
E. dissimilis Semp., viii, 220.
E. duplocincta Mart., viii, 216.
E. elatior Mts., iii, 210.
E. extrusa T.-C., viii, 218.
E. fodiens Pfr., iii, 212.
E. fortunei Pfr., iii, 208.
 v. meridionalis Mlldff.
E. frilleyi C. & D., iv, 49.
E. fruticum Müll. iii, 200.
 terrestris Gmel.
 cinerea Poir.
 lucana Vallot.
 carduelis Reib.
 f. anderssoni Cless.
 f. mosellica Bgt.
 f. aubiniana Bgt.
 f. lemonia Bgt.
 f. dumorum Bgt.
 v. insularum West.
E. fuchsi Gredl.
E. graminum Hde., iii, 207.
E. hæsitans Hde.
E. hemisphærica Mlldff., viii, 223.
E. huberiana Hde., iv, 49.
E. impatiens Hde.
E. improvisa Hde., iii, 220.
E. jourdyi Morl., viii, 219.
E. laeta Gld., iv, 47.
E. latrunculum Hde., iii, 221.
E. leprosa Hde.
E. leprosula Hde., iii, 220.
E. maaekii Gerst., iii, 209.
 v. depressior Pfr.
 convauxiana Hde., iii, 209.
E. mabiliei Cr., iii, 216.
E. middendorffi Gerst., iv, 111.
E. mighelsiana Pfr., iii, 212.
E. miliaria Gredl.
E. mimicula Hde.
E. mola Hde.
E. nucleus Dh., iii, 207.
E. ? cenostoma Dh., viii, 223.
E. oncopila Hde., iii, 208.
E. oscitans Mts., iv, 47.
E. paricincta Mart., viii, 217.
 f. bisbicincta Mart.
 f. ambicincta Mart.
 f. incincta Mart.
 f. bilaticincta Mart.
E. peguensis Bens., vi, 113.
E. phæozona Mts., iii, 205.
E. phragmitium Hde., iv, 48.
E. physeta Anc., iv, 50.
E. pilidion Bens., vi, 114.
E. plicosa Mts. Nachr., '94, 135.

- E. radicola* Bens., iii, 210.
E. ravida Bens., iv, 48.
 helvacea Ph.
 v. *lineolata* Mlldff., iv, 48.
E. ravidula Hde., iv, 49.
E. redfieldi Pfr., iv, 49.
E. rubens Mts., iii, 205.
 f. *concolor* Mts.
 f. *finchiana* Mts.
 f. *zeiliana* Mts.
 f. *regeliana* Mts.
E. ruppelli Dh., iii, 210.
E. scalpturita Bens., iii, 211.
E. schadenbergi Mlldff., viii, 223.
E. selskii Gerst., iv, 47.
E. semenovi Mart.
E. serotina Ad., vi, 106.
E. sieboldtiana Pfr., iv, 47.
E. similaris Fér., iii, 205.
 translucens King.
 woodiana Lea.
 squalida Ziegl.
 addita Fér.
 epixantha Pfr.
 f. *stimpsoni* Pfr., iii, 206.
 genulabris Mart.
 f. *arcasiana* C. & D., iii, 206.
 f. *borbonica* Dh., iii, 206.
 f. *hongkongensis* Dh., iii, 206.
 f. *obscura* Dh., iii, 206.
E. suffodiens Bttg., viii, 219.
E. straminea Hde., iii, 207.
E. striatissima Dh., iii, 207.
E. tenimberica Mlldff., viii, 220.
E. tourannensis Soul., iii, 209.
 globula Lea.
 clusilis Val.
 f. *rhodostoma* Mlldff.
E. transversalis Mss., iii, 210.
E. vagoina Gredl., iv, 257.
E. weyrichi Schr., iii, 209.
E. zoroaster Theob., iii, 211.

Section *Armandia* Ancey, 1883.

Armandia ANC., Il. Nat. Sicil., ii, p. 143, type *H. davidi* Dh. (March, 1883).

Shell rather small, quite *thin*, depressed-convex, the spire low-conoidal, of few (about 4) rapidly widening whorls; apex obtuse. Aperture very oblique; peristome a trifle expanded, acute, much dilated at the columellar insertion, partly closing the narrow umbilicus.

Anatomy unknown. Type *H. davidi* Desh. (See pl. 64, figs. 4, 5, 6, *E. calymma* Schm. & Bttg.).

Distribution: Thibet; interior China. The affinities of this group can only be guessed until the soft parts are made known.

- E. davidi* Dh., ii, 103.
 sinica Mts.
E. moupiniana Dh., ii, 103.
E. calymma Schm. & Bttg.
 E. plicatilis Dh., ii, 103.
 E. sarelii Mts., iv, 49.
 nora H. Ad.

Section *Cathaica* v. Möllendorff, 1884.

Cathaica MLLDFF., Jahrb. D. M. Ges., 1884, p. 339, type *H. pyrrhizona* Ph.—PILSERY, Man. Conch., viii, p. 204. Not *Cathai-cus* Bates, 1870 (coleoptera).

Shell umbilicated, depressed, sculptured with striæ or riblets; whorls 5-7, slightly convex, the last usually somewhat angular at periphery. Aperture oblique; peristome thickened within, the upper margin unexpanded, outer and basal margins expanded, columella dilated. Type *E. fasciola* Dr. (= *pyrrhozona* Phil.) pl. 55, figs. 6, 7.

Animal with the tail rounded above, no longitudinal groove. Sole indistinctly tripartite.

Jaw arcuate, with 3 to 7 weak ribs (pl. 65, fig. 8, *pyrrhozona*; pl. 65, fig. 15, *przewalskii*).

Radula with blunt mesocones on median and lateral teeth; marginals with the ectocone simple or bifid (pl. 65, fig. 7, *pyrrhozona*; pl. 65, figs. 16, 17, middle, and 1st, 2d, 10th, 14th, 18th, 23d, and 3 marginal teeth of *przewalskii*).

Genitalia: penis slender, ending in a long retractor and the terminal vas deferens. Dart sack large, opening into atrium, one dense cluster of about 10 club-shaped, glandular mucus glands inserted near its base. Spermatheca duct long (pl. 66, fig. 32, *E. pyrrhozona*).

Distribution, north and middle China and Central Asia.

- | | |
|---|---|
| <i>E. brevispira</i> H. Ad., viii, 208. | <i>E. pandynama</i> Mab., viii, 194. |
| <i>E. buddæ</i> Hilb., viii, 208. | <i>E. pekinensis</i> Dh., viii, 205: |
| <i>E. buvigneri</i> Dh., viii, 212. | <i> tchiliensis</i> Mlldff. |
| <i> richthofeni</i> Mts. | <i> f. conoidea</i> Dh. |
| <i>E. confucii</i> Hilb., viii, 213. | <i>E. przewalskii</i> Mts., viii, 209. |
| <i>E. constantie</i> H. Ad., viii, 206. | <i> mencii</i> Hilb. |
| <i> "constantinae,"</i> viii, 206. | <i>E. pulveratricula</i> Mts., viii, 211. |
| <i>E. desgodinsi</i> Bgt., viii, 194. | <i> "pulverella"</i> on pl. |
| <i>E. giraudeliana</i> Hde., viii, 210. | <i> loczyi</i> Hilb. |
| <i>E. græseri</i> Mouss., viii, 205. | <i>E. pulveratrix</i> Mts., viii, 211. |
| <i>E. gredleri</i> Hilb., viii, 209. | <i>E. fasciola</i> Drap. iii, 208. |
| <i> stoliczkana</i> Hilb., olim. | <i> pyrrhozona</i> Ph., viii, 204. |
| <i>E. heudei</i> Hilb., viii, 210. | <i> fasciola</i> Dr., iii, 208. |
| <i>E. inopinata</i> Dh., viii, 207. | <i>E. schensiensis</i> Hilb., viii, 211. |
| <i>E. kreitneri</i> Hilb., viii, 211. | <i>E. sempriniana</i> Hde., viii, 207. |
| <i>E. lutuosa</i> Dh., viii, 212. | <i>E. siningfuensis</i> Hilb., viii, 211. |
| <i> "lutosa"</i> Try., iii, 208. | <i>E. stoliczkana</i> Nev., iii, 250. |
| <i>E. magnaciana</i> Hde., viii, 207. | <i>E. subrugosa</i> Dh., viii, 211. |
| <i>E. mongolica</i> Mlldff., viii, 206. | <i> v. kalganensis</i> Mlldff. |
| <i>E. orythia</i> Mts., viii, 210. | <i>E. thibetica</i> Dh., viii, 208. |
| | <i> tibetica</i> Mlldff. |

Sinistral species.

- | | |
|---------------------------------|-------------------------------|
| E. christinæ H. Ad., viii, 213. | E. filippina Hde., viii, 214. |
| <i>subchristinæ</i> Anc. | E. dejeana Hde., viii, 215. |
| v. <i>subsimilis</i> Dh. | E. anceyi Mlldff., viii, 215. |
| ? <i>carinifera</i> Ad. | |

Section *Pseudiberus* Ancey, 1887.

Pseudiberus ANC., Conchologist's Exchange, i, p. 76 (June, 1887), types *H. tectumsinense*, *zenonis*, etc.

Shell depressed-trochoidal, keeled, narrowly umbilicated, rudely striated; heavy, cretaceous and whitish; whorls about 5, the last deflexed. Aperture rhombic, oblique, the lip straight above, deeply arched, expanded and much thickened within, below. Type *E. tectumsinense* Mts., pl. 55, figs. 8, 9.

The anatomy of these snails is unknown, but they are probably a keeled and chalky manifestation of the *Cathaica* type. They inhabit interior China and central Asia.

- | | |
|--------------------------------|-------------------------------|
| E. tectumsinense Mts., iv, 59. | E. plectotropis Mts., iv, 58. |
| E. zenonis Gredl., iv, 59. | E. mataianensis Nev., iv, 59. |

Section *Platypetatus* Pilsbry, 1894.

Shell lens-shaped, acutely keeled, thin, umbilicated; whorls $4\frac{1}{2}$, the last descending in front. Surface smoothish. Aperture sub-horizontal, oval; peristome expanded, reflexed below, the ends approaching and connected across the parietal wall. Type *E. innominata* Hde.

- | | |
|--------------------------------|--------------------------------|
| E. mariella H. Ad., viii, 196. | E. innominata Hde., viii, 197. |
| v. <i>submariella</i> Pils. | ? <i>aquila</i> H. Ad. |

Section *Thysanota* Albers, 1860.

Thysanota ALB., Die Hel., 1860, p. 63, type *H. guerini* Pfr.

Shell thin, corneous, narrowly umbilicated, trochiform; whorls numerous (7 to 8), narrow, with a fringe of hairs at the keeled periphery, extending up the suture. Base flattened; aperture angulate-lunar, the lip thin, simple, the columellar margin hardly expanded. Type *E. guerini* Pfr.

Distribution, Nilgiri and Anamullay Hills, southern India.

The anatomy is unknown. The group has usually been placed near *Trochomorpha*, but I am disposed to consider it near *Plectotropis*, partly on account of its hairy keel, partly because Blanford indicates *guerini* as a species lacking tail-pore. On the other hand, the simplicity of the lip favors the other view.

E. guerini Pfr., iii, 93.

E. tabida Pfr., iii, 94.

erinigera Bens., iii, 94.

Section *Plectotropis* Martens, 1860.

Plectotropis v. MART., Die Hel., p. 121, type *H. elegantissima* Pfr.—*Thea* ALB., Die Hel., 1850, p. 118, not *Thea* Mulsant, 1846.

Shell depressed and carinated, widely umbilicated, dull and brown, with more or less shaggy cuticle and usually a peripheral fringe of hairs; whorls numerous (5 to 8), narrow and slowly increasing. Aperture small, angulate-lunar, oblique; lip narrowly expanded, reflexed below. Type *elegantissima*, pl. 64, figs. 18, 19. (See also pl. 64, figs. 16, 17, *E. mackensii*, typical form from Okinawa I., Liukiu group).

Jaw high-arched, with many (10–19) ribs, more or less denticulating the basal margin (Pl. 65, fig. 13, *E. vulvivaga*).

Radula (pl. 65, fig. 14, *E. vulvivaga*) having the middle tooth without side cusps, but with a lateral bulging, middle cusps about the length of basal-plate; laterals with a small ectocone. Marginals with the long inner cusp bifid, ectocone split into two. The dentition of *sumatrana* and *vulvivaga* is practically the same.

Genitalia (pl. 66, figs. 33, 34, *E. vulvivaga*): penis rather long, epiphallus short, strongly bent at the attachment of retractor, continued in a rather short, blunt flagellum. Dart sack large, containing a long, slightly curved dart, lens-shaped in section (fig. 34). Mucus gland inserted high on dart sack, divided into two glandular branches which are wide, flattened and rather incoherent, the dart sack and glands bound loosely to vagina. Duct of spermatheca very long and slender, without diverticulum, bound to oviduct.

Distribution: Japan, China and adjacent islands, south to Sumatra.

The anatomy of this group is known by Wiegmann's work on *sumatrana* and *rotatoria*, and by my own dissections. *E. rotatoria* has much the same form of genitalia as I have found in *E. vulvivaga*,

except for the dart sack and its appendages, which are absent in Wiegmann's figure. His specimen was a young one, and the organs may have been undeveloped; but I do not think this so likely as that the species is really no *Plectotropis*, but a *Ganesella*. Until adult examples are examined, I do not venture to transfer the species, especially since a vast majority of the forms of both groups are still anatomically unknown, and their systematic position consequently is only arbitrarily fixed by slight and obscure shell features.

- E. mackensii* Ad. & Rv., iv, 52. *E. winteriana* Pfr., iv, 54.
 v. *mystagoga* Mab., viii, 193. *E. intumescens* Mts., iv, 54.
 v. *vulvivaga* Schm. & Bttg., viii, 193. *E. luzonica* Mlldff., Nachr., '94, 114.
E. gerlachi Möll., iv, 52. *E. sterilis* Hde.
 v. *granulosostriata* Mts. *E. demolita* Hde.
 v. *abrupta* Mts. *E. laciniata* Hde.
 v. *huanicola* Gredl. *calculus* Hde., not Lwe.
E. lacinosula Hde., iv, 53. *E. sedentaria* Hde.
laciniosa Hde., not Lwe. *E. parasitarum* Hde.
E. trichotropis Pfr., iv, 53. *E. parasitica* Hde.
 v. *laciniata* Hde., iv, 53. *E. perplanata* Nev., iv, 57.
 v. *shanghaiensis* Pfr., iv, 56. *E. akoutongensis* Theob., iv, 57.
E. elegantissima Pfr., iv, 52. *E. emensus* Aust., P. Z. S. '88, 242.
pretiosa Alb. *E. ancylochila* Cr., iv, 55.
E. scepasma Pfr., iv, 58. *E. mitanensis* G.-A., viii, 195.
E. ciliosa Pfr., iv, 55. *E. grumulus* G.-A., viii, 195.
E. lautsi Schm. & Bttg., viii, 193. *E. pudica* G.-A., viii, 195.
 v. *brachylasia* S. & B., viii, 194. *E. emma* Pfr., iv, 53.
E. squarrosa Gld., viii, 194. *E. huttoni* Pfr., iv, 54.
E. granti Pfr. *orbicula* Hutt., not Orb.
E. ningpoensis Bttg., viii, 194. v. *savadiensis* Nev.
E. esau Gredl., viii, 158. *E. clarus* Aust., P. Z. S., '88, 242.
E. patungana Gredl., viii, 158. *E. catostoma* Bens., iv, 62.
E. lupensis Gredl., iv, 54. *E. oldhami* Bens., iv, 61.
orthocheilis Hde. *E. tapeina* Bens., iv, 53.
E. (?) barbosella Hde., iv, 55. v. *bhamoensis* Nev., iv, 54.
E. subconella Mlldff., iv, 258. *E. (?) rotatoria* Busch., iv, 54.
E. loufouana Mlldff., iv, 258. *E. sumatrana* Mts., iv, 56.
E. visayana Mlldff. v. *moussoniana* Mts.
winteriana Semp. *E. squamulosa* Mss., iv, 56.

Section *Aegista* Albers, 1860.

Aegista ALB., Die Hel., 1860, p. 121, type *H. oculus* Pfr.

Shell depressed and broadly umbilicated, solid, striated; brown, unicolored or with a light peripheral band; spire low, composed of many narrow whorls, the last not keeled, descending in front. Aperture round lunar, oblique, the peristome toothless, narrowly expanded, somewhat thickened within, reflexed at base, ends converging. Type *E. oculus* Pfr., pl. 64, figs. 13, 14, 15.

External anatomy and genitalia unknown. Jaw arcuate, with about 6 wide, low, but separated ribs (pl. 65, fig. 10, *E. platyomphala*). Radula showing the same characters described for *Plectotropis*, but the outer marginals have the ectocone bifid (pl. 65, fig. 9, *E. platyomphala*).

Shells of this section differ from *Plectotropis* in lacking the peripheral keel and in the smoother surface, but there are some intermediate species. It has the same geographic range, extending northward to Kiusiu Island, Japan. The jaw of the only species examined has fewer ribs than in *Plectotropis*, but this is not likely to prove a constant difference.

(*Species of Japan, Liukiu Islands and Formosa.*)

- | | |
|---|--------------------------------------|
| <i>E. kobensis</i> Schm. & Bttg., viii, | <i>E. oculus</i> Pfr., iv, 59. |
| 196. | <i>typinsana</i> A. & R. |
| <i>E. friedeliana</i> Mart., iv, 61. | <i>E. vermis</i> Rve., iv, 60. |
| <i>E. circulus</i> Pfr., iv, 61. | <i>E. subchinensis</i> Nev., iv, 62. |

(*Species of China and India.*)

- | | |
|--|-------------------------------------|
| <i>E. chinensis</i> Phil., iv, 60. | <i>E. subcinctula</i> Hde. |
| <i>E. pseudochinensis</i> Möll., iv, 60. | <i>E. squamosella</i> Hde. |
| <i>chinensis</i> Hde., not Phil. | <i>E. mensalis</i> Hde. |
| <i>E. platyomphala</i> Möll., iv, 61. | <i>E. thoracica</i> Hde., iii, 221. |
| <i>E. serpestes</i> Hde. | <i>E. secundaria</i> Hde. |
| <i>E. herpestes</i> Hde., iv, 60. | <i>E. mellita</i> Hde. |
| <i>E. furtiva</i> Hde., iv, 60. | <i>E. mellitula</i> Hde. |
| <i>E. aubryana</i> Hde., iv, 60. | <i>E. permellita</i> Hde. |
| <i>E. accresens</i> Hde., iv, 61. | <i>E. rebellis</i> Hde. |
| <i>E. hupeana</i> Gredl., iv, 259. | <i>E. languescens</i> Hde. |
| <i>E. phayrei</i> Theob., iv, 55. | <i>E. vicinella</i> Hde. |

- | | |
|------------------------------------|------------------------------------|
| <i>E. gottschei</i> Möll., iv, 62. | <i>E. turbo</i> Pils. |
| <i>E. alphonsi</i> Dh., iv, 61. | <i>turbinella</i> Hde., not Morel. |
| <i>E. araneætelæ</i> Hde., iv, 59. | <i>E. talifouensis</i> Hde. |
| <i>E. accedens</i> Hde. | <i>taliensis</i> Hde. |
| v. <i>initialis</i> Hde., iv, 62. | <i>E. puberosula</i> Hde., iv, 56. |
| <i>E. radulella</i> Hde., iv, 57. | <i>pulverulenta</i> H., not Lwe. |

Section *Coccoglypta* Pilsbry, 1894.

Shell depressed conoidal with open umbilicus, solid, opaque and uniform brown; surface roughened by irregular oblique growth wrinkles and an uneven granulation; whorls about 6, convex, the last inconspicuously angled at periphery, rather tubular, slightly deflexed in front. Aperture small, round-lunate, oblique; lip simple above, expanded outwardly and below, somewhat dilated at columellar insertion. Type *H. dimidiata* Hde. (See pl. 64, figs. 20, 21, 22, 23, *E. pinchoniana* Hde.).

This Chinese group is unknown anatomically, but in my opinion its species cannot be included in either *Aegista*, *Plectotropis*, *Eulota* or *Cathaica*. The general figure of the shell reminds one of such large American *Pyramidulas* as *P. solitaria* or *cooperi*; but I have little doubt that *Coccoglypta* will prove a member of the *Eulota* group, conchologically distinguished by its granular shell with non-reflexed lip. The peripheral angulation is barely mentionable. It is probable that other species now placed in *Aegista* or *Ganesella* will prove to belong here.

- | | |
|--------------------------|----------------------------|
| <i>E. dimidiata</i> Hde. | <i>E. pinchoniana</i> Hde. |
|--------------------------|----------------------------|

Section *Mastigeulota* Pilsbry, 1894.

Shell globose-depressed, rather solid, but like *Eulota* in form and sculpture. Jaw arcuate, with about 7 convex ribs. Radula much as in *Eulota*. Genital system (pl. 66, fig. 26, *E. kiangsinensis*) like *Eulota* in the dart sack and accessory sack, the dart long and slightly curved, a little flattened; mucus gland consisting of numerous sacculated branches bound together and to the *d. s.* (but shown torn free in figure), as in *Euhadra* and some *Eulotas*. Penis ending in a flagellum, and in *E. kiangsinensis* it is dilated above into a hollow, thin-walled bulb.

This section is founded upon *E. kiangsinensis*, which has the essential features of *Euhadra* rather than *Eulota*, the penis bearing

a flagellum. Probably some other Chinese species will prove to belong here, which are now placed in *Eulota*. The natural limits of these minor groups cannot be defined until more forms are known anatomically, although much can still be done by careful comparisons of large series of Oriental shells.

E. kiangsinensis Mts., viii, 216. Middle China.

? *unizonalis* H. Ad.

v. *major* Mildff.

v. *cerasina* Gredler.

Section *Tricheulota* Pilsbry, 1894.

Chloritis SEMPER, Reisen p. 234, not of Beck.

Shell rather thin, umbilicated, depressed, all over hairy; aperture nearly vertical, lunate, the lip well expanded. Type *E. spinosissima* Semper.

Genitalia: Penis club-shaped, passing into a long epiphallus which ends in a flagellum. Dart sack large, the single long, club-shaped mucus gland inserted upon it (as in the section *Monadenia* of *Epiphragmophora*). Spermatheca with short duct, less than half the length of uterus.

Differs from *Mastigeulota* and *Euhadra* in the single club-shaped mucus gland, and the hairy shell. The presence of a flagellum separates this group from *Eulota*. The species are from Mindanao, Philippines. Conf. *Chloritis*? *brevidens*, etc.

E. sanziana H. & J., vi, 272.

E. spinosissima Semp., vi, 273.

lituus Rve, figs. 93a, b.

boxalli Sowb.

Section *Euhadra* Pilsbry, 1890.

Euhadra PILS., Man. Conch. (2) vi, p. 94, 95, 305.—*Hadra* and *Camana* of authors.

Shell dextral or sinistral, rather large and thin, capacious, depressed, with low or conic spire and moderate or closed umbilicus; whorls about 6; surface striated and typically decussated by microscopic spiral lines; banded or streaked, rarely unicolored. Aperture lunate, oblique, the peristome expanded throughout, subreflexed at base. Type *E. peliomphala* Pfr., pl. 64, figs. 1, 2. (See also pl. 64, fig. 3, *amaliae*, and fig. 9, *E. quasita* var. *perryi* Jay).

Jaw wide, arched, with 8 to 14 wide, contiguous ribs, (pl. 65, fig. 12, *E. quæsitæ* var. *perryi*).

Radula having mesocones only on middle and inner lateral teeth; outer laterals with ectocone. Inner marginals with bifid oblique inner and simple outer cusp, the outer teeth with bifid ectocone (pl. 65, fig. 11, *E. quæsitæ* var. *perryi*).

Genital system (pl. 66, figs. 27, 28, 29, *E. quæsitæ* var. *perryi*) having the penis long; epiphallus long, bearing the retractor, flagellum rather short; dart sack enormous, containing a flattened, longitudinally costate dart, (figs. 27, 28); adnate on d. s. is an accessory sack, upon which a cluster of sacculated mucus glands is inserted, these glands being closely bound together and to the dart sack, as in other forms of *Eulota*, and with fibres connecting with uterus. Duct of the globose spermatheca long. (In fig. 29 the mucus glands are shown torn free from each other and from the dart sack by the removal of their investing membrane, as has been done with the other figures on plate 66).

Euhadra was instituted to include a group of rather large species of Japan and China, which had been placed in *Hadra* and *Camæna* by authors. It contains the largest and most conspicuously colored belogonous Helices of East Asia, excepting, of course, the Philippine Island Helicostylas. The bands of these forms are not homologous with those of European Helices, excepting possibly the supraperipheral one, which was probably present in very ancient Helices, and is retained in many and diverse groups.

The Japanese forms of *Euhadra* are so variable that after examining about a thousand specimens from many localities, I am disposed to consider some forms described by Kobelt and others merely varieties. The genitalia of *quæsitæ*, *pelionphala* and *brandtii* are very similar, but the first of these has more ribs on the jaw.

(Group of *Simodæ*).

- | | |
|-----------------------------------|-------------------------------------|
| <i>E. simodæ</i> Jay, vi, 95. | <i>E. hermannseni</i> Pfr., vi, 98. |
| <i>E. connivens</i> Pfr., vi, 96. | <i>koreana</i> Pfr. |
| v. <i>phæogramma</i> Anc. | |

(Group of *Luhuana*).

- | | |
|-------------------------------------|-----------------------------------|
| <i>E. luhuana</i> Sowb., vi, 305. | v. <i>callizona</i> Cr., vi, 105. |
| <i>luhuana</i> Auct. | v. <i>amaliæ</i> Kob., vi, 105. |
| v. <i>pelionphala</i> Pfr., vi, 99. | <i>congener</i> Sm. |
| <i>japonica</i> Dh., not Fér. | v. <i>congenita</i> Sm., vi, 103. |

- | | |
|-------------------------------|-----------------------------------|
| E. luhuana. | E. herklotsi Mts., vi, 101. |
| v. eoa Cr., vi, 98. | E. senckenbergiana Kob., vi, 102. |
| v. sandai Kob. | E. miranda Ad., vi, 104. |
| v. subatra Pils. | E. lewisii Sm., vi, 106. |
| v. subnimbosa Kob. | E. myomphala Mts., vi, 107. |
| v. nimbosa Cr., vi, 101. | <i>daimio</i> Ad. |
| v. brandtii Kob., vi, 101. | E. quæsitæ Dh., vi, 108. |
| v. nipponensis Kob. | v. perryi Jay, vi, 108. |
| v. hickonis Kob. | <i>montium</i> Mts. |
| <i>conica</i> Pils., vi, 305. | |

(Group of *Swinhoei*).

- | | |
|----------------------------------|---------------------------------|
| E. swinhoei Pfr., vi, 115. | E. schmackeri Mlldff., vi, 307. |
| E. caspari Mlldff., vi, 115. | E. ammiralis Pfr., vi, 117. |
| E. pantheia Mab., vi, 116. | E. cecillei Phil., vi, 109. |
| E. granulifera Mlldff., vi, 306. | E. moreletiana Hde., vi, 110. |
| E. renaltiana Hde., vi, 307. | E. bairdi H. Ad., vi, 111. |

(Group of *Succincta*).

- | | |
|---------------------------------|-----------------------------------|
| E. succincta H. Ad., vi, 118. | E. delavayana Hde. |
| E. friesiana Mlldff., vi, 118. | E. hemiclista Schm. & Bttg. |
| E. stenozone Mlldff., vi, 118. | E. mercatoria Gray, vi, 121. |
| E. hæmatozone Hde., vi, 119. | E. mellea Pfr., vi, 97. |
| E. submandarina Pils., vi, 122. | E. purpurascens Pfr., viii, 297. |
| E. nux Mlldff., vi, 307. | E. massiei Morl., viii, 223. |
| E. cremata Hde. | E. philippinensis Semp., vi, 123. |
| E. seguiniana Hde. | |

(Group of *Batanica*).

- | | |
|---------------------------------|-----------------------------------|
| E. latilabris Mlldff., vi, 109. | E. batanica A. & R., vi, 111. |
| E. yaeyamensis Pils. | v. pancala S. & B., viii, 224. |
| E. formosensis Pfr., vi, 112. | <i>sinistrorsa</i> Möll., not Dh. |
| | E. bacca Pfr., vi, 112. |

Section *Mandarina* Pils., 1894.

Shell solid, compact, globose-conic; *axis solid*, imperforate.

- | | |
|-----------------------------|-----------|
| E. mandarina Gray, vi, 124. | Bonin Is. |
|-----------------------------|-----------|

Genus CHLORÆA Albers, 1850.

Chloræa ALB., Die Hel., p. 113; v. MART., edit., p. 169, type *H. sirena*.—Gruppe der bunt-schaligen *Chloræen* SEMPER, Reisen, etc., p. 226.—PILSERY, Manual vii, p. 93.

Shell *imperforate*, varying from depressed-globose to lens shaped, generally solid; whorls 4-5, the last descending in front or not; lip decidedly reflexed, at least below. *Entire surface* showing under the lens *excessively fine close spiral lines*; *lacking hydrophanous markings*. Type *C. sirena*, pl. 55, figs. 15, 16, 17.

Foot, jaw and radula (pl. 54, fig. 3, *benguensis*) as in *Helicostyla*.

Genital system (pl. 54, figs. 2, 4, *benguensis*); penis as in *Helicostyla*, without flagellum (*benguensis*, *hugeli*), or having a very short one (*sirena*). Dart sack oval, containing a long lance-shaped dart (pl. 54, fig. 4, *benguensis*). Mucus gland single, lengthened, composed of irregularly grouped large follicles. Duct of spermatheca moderately long.

Distribution: Luzon, Marinduque, Mindoro, Cebu, Tablas, Mindanao, Sibuyan, Luban and Guimaras, Philippines; *living upon trees*.

This group is more allied to *Eulota* than to *Helicostyla* in the soft anatomy and dart; but the species have assumed the arboreal habits and bright coloring of the latter genus.

Group of C. fibula.

- | | |
|--|--|
| <i>C. fibula</i> Brod., vii, 94. | <i>C. amoena</i> Pfr., vii, 98. |
| <i>C. hanleyi</i> Pfr., vii, 95. | <i>C. sirena</i> Beck, vii, 98. |
| <i>v. hugeli</i> Pfr. | <i>v. cebuana</i> Mlldff. |
| <i>bifasciata</i> Lea. | <i>v. guimarasensis</i> Pils. |
| <i>C. benguensis</i> Semp., vii, 96. | <i>C. pelewana</i> Mouss., vii, 99. |
| <i>C. geotrochus</i> Mlldff., vii, 97. | <i>C. gmeliniana</i> Pfr., vii, 100. |
| <i>C. antonii</i> Semp., vii, 97. | <i>C. hennigiana</i> Mlldff., Nachr., '93,
173. |

Group of C. dryope.

- | | |
|-----------------------------------|---|
| <i>C. dryope</i> Brod., vii, 100. | <i>C. coerulea</i> Mlldff., vii, 101. |
| <i>prasina</i> Koch. | <i>C. cristatella</i> Mlldff., Nachr., '93,
173. |

Group of C. paradoxa.

- | | |
|------------------------------------|--------------------------------------|
| <i>C. paradoxa</i> Pfr., vii, 102. | <i>C. constricta</i> Pfr., vii, 103. |
| <i>f. immaculata</i> Pils. | <i>restricta</i> Pfr. |
| <i>C. undina</i> Pfr., vii, 102. | <i>stenopsis</i> Moq. |

*Group of C. thersites.**C. thersites* Brod., vii, 104.*C. malleata* Q. & M. Nachr., '93,
174.Genus *HELICOSTYLA* Férussac.

Helicostyla FER., Tabl. Syst., p. 46, in part.—BECK, Index Moll., p. 36, 1837, in part.—ALBERS, Die Hel., 1850, p. 104.—H. & A. ADAMS, Gen. Rec. Moll., ii, p. 191.—MARTENS, Die Hel., p. 175, type *H. mirabilis* Fér.—*Cochostyla* FER., Tab. Syst., p. 47, 1819.—SEMPER, Reisen in Arch. Phil., Land Moll., p. 164.—PILSBRY, Man. Conch., vii, p. 92. Includes the groups *Chlorœa*, *Corœsia*, *Crystallopsiis*, *Axina*, *Pfeifferia*, *Calocochlia*, *Helicostyla*, *Orustia*, *Cochlodryas*, *Orthostylus*, *Helicobulinus*, *Ptychostylus*, *Phengus*, *Eudoxus*, *Hypselostyla*, *Canistrum*, *Prochilus*, *Chrysallis*, etc.

For anatomy see SEMPER, Reisen im Archip. Phil. and PFEFFER, Jahrb. Dm. Ges., 1878, p. 195.

Shell varying from depressed, helicoid, to elevated and bulimoid, imperforate, with *solid columella* (except in *Crystallopsiis* and *Chrysallis*); surface smooth or roughened, usually covered with a thin, transparent cuticle, often *porous in places when it becomes white and opaque, producing the "hydrophanous" pattern* which ornaments most species, and which disappears upon wetting the shell. Aperture toothless, but sometimes having a columellar twist or truncation; the lip reflexed (but simple in *Pfeifferia*). Type *H. mirabilis* Fér. (see pl. 53, fig. 1-11).

Foot without pedal margination; a small left body-lappet often developed; kidney elongated. (Pl. 54, fig. 10, *H. festiva*; pl. 54, fig. 5, *H. monticula*).

Jaw ribbed (pl. 54, fig. 6, *H. butleri*).

Radula with bluntly pointed or truncated mesocones on middle and lateral teeth, *without trace of side cusps*. Marginal teeth having the entocone indicated by a split in the broad inner cusp, a small simple ectocone being developed. (See pl. 54, fig. 11, *H. aegle*; pl. 54, fig. 12, *H. pulcherrima*).

Genital system: Penis moderately long, passing into an epiphallus which bears the retractor; flagellum wanting. Dart sack short and globose, seated on atrium or low on vagina, bearing an accessory sack into which the mucus gland opens. Mucus gland globular or

oval, with a very short duct, its thick wall composed of radially arranged follicles (pl. 54, fig. 7, longitudinal section of mucus gland of *H. butleri*). Dart short, straight, and round in section. Spermatheca oval, on a long, branchless duct (pl. 54, fig. 8, *H. butleri*; pl. 54, fig. 9, *H. pithogaster* with its dart).

Distribution: Philippine Is., with a few species in the Moluccas, in New Guinea and the Solomon Islands. Habits mainly arboreal.

As in most large genera of Helices, the shells of *Helicostyla* exhibit a very wide range of forms, some being heavy, dark, depressed and keeled, others globose and thin with brilliant green or variegated coloring, while still other species are of an elongated *Bulinus*-like contour. Peculiar air-permeated cream-white epidermal bands and patches are characteristic of many but by no means all species, and in most the columella is solid.

The jaw is of the usual ribbed type. The teeth are like those of some Papuinas, but in the lack of side cusps on middle and lateral teeth they resemble *Eulota*. The genital system is highly characteristic in the globose form of the mucus gland, which as in other *Belogona euadenia* is inserted on the dart sack. In the subgenus *Canistrum* (q. v.) a variation in this is found. Our knowledge of the anatomy is due to Semper, whose work upon the group leaves little to be desired except the examination of those subgenera which he did not dissect, *Prochilus*, *Chrysallis*, *Papustyla*, *Crystallopsis*, etc., and the further investigation of *Canistrum* and allied forms.

It is clear that *Helicostyla* is very near in anatomy to the primitive *Belogonous* stock, retaining early characters in the simple unsplit and nearly sessile mucus gland and needle-like, bladeless dart. Its differentiation in shell characters is attributable to long isolation and the assumption of arboreal habits. The Philippine *Chloræas* were probably derived from a later incursion or an early split, which has not spread through the entire Philippine group. The *Camena*, *Euhadra* and *Eulota* forms are perhaps to be regarded as a more recent addition to the fauna.

The subgenus *Helicostyla* was proposed by Férussac for a heterogeneous assemblage of shells including certain *Zonitidæ*, two *Sagdas* and a *Gastrodonta*, the two species of *Stylodonta*, *Cepolis* (*Coryda*) *alanda* and *H. mirabilis* and *coniformis*. The *Sagda* and *Gastrodonta* were later removed from the group by Férussac himself (Tabl. Syst., p. 67); and Beck in 1837 eliminated from it most

other incongruous elements, leaving only *H. alauda* and its varieties and *H. mirabilis* (galactites), and adding *smaragdus* and *roissyana*. Albers in 1850 restricted *Helicostyla* to Philippine Island snails of the *mirabilis* type, erecting for the West Indian *H. alauda* the new group *Coryda*. H. & A. Adams make *Helicostyla* a genus to include *Calocochlea*, *Corasia*, *Axina*, *Chloræa*, etc., and place the elongated forms in genus *Cochlostyla* under *Buliminæ*.

Cochlostyla was instituted by Férussac on the page of the *Tableaux* after *Helicostyla*, and contained species belonging to the groups *Helicostyla*, *Helicobulinus*, *Orthostylus*, *Cylindrus*, *Caryodes*, *Orphnus*, *Dryptus*, *Orthalicus*, etc. The name dropped out of nomenclature entirely until 1847, when Gray names it under *Orthostylus*, giving *metaformis* as its type. Later, the Adams brothers revived it as a genus for elongated Philippine Island forms; and in 1860 von Martens uses it in much the same sense. In enlarging the genus to include both depressed and elongated species, Semper unfortunately retains the name *Cochlostyla* for the entire series, a course which has been followed by subsequent writers.

In conclusion it is evident that for this genus we must use the name *Helicostyla*, which not only has prior position in Férussac's work, but was restricted in 1837 by Beck and properly limited by Albers; while *Cochlostyla* was later in the original publication, and remained a heterogeneous mass of *Bulimi* and *Helicostylæ* until Gray in 1847 selected *metaformis* as its type.

Subdivisions.

With the exception of *Canistrum*, the sections of this genus are practically identical in anatomy; and rest upon such shell characters as contour, thickness and sculpture. The presence of intermediate species renders their arrangement somewhat artificial.

Depressed or globose, thin, without hydrophanous cuticle.

Globose, white, lip simple and sharp, *Pfeifferia*.

Lip expanded or reflexed, *Corasia*, *Crystallopsis*.

Globose, few whorled, with hydrophanous bands, *Leytia*.

Globose or depressed, solid, lip expanded or reflexed.

No hydrophanous cuticle, lip narrow; highly colored, *Chromatosphaera*.

Hydrophanous cuticle present, lip wider, *Calocochlea*.

Dark, depressed and much roughened forms, *Trachystyla*.

Dark and smoothish forms, *Anica*.

Globose or elevated-oval, moderate sized or small.

Heavy and thick, without hydrophanous cuticle, *Pachysphæra*.

Oblong, not especially heavy, color in browns, *Helicostyla*.

Oblong, suture white-bordered, color vivid, *Cochlodryas*.

Subconic, with hydrophanous cuticle, *Orustia*.

Elevated and conical or turbinate, mostly large.

Whorls numerous, equal; columella very short with a strong fold,
Columpica.

Whorls more rapidly increasing; columella longer, *Orthostylus*,
Helicobulinus.

Elongated and bulimoid.

Imperforate, *Hypselostyla*, *Papustyla*, *Eudoxus*, *Phengus*, *Canistrum*.

Perforated, *Prochilus*, *Chrysallis*.

Section *Corasia* Albers, 1850.

Corasia ALB., Die Hel., p. 111; second edit., p. 170, type *H. virgo*.

Shell imperforate, depressed-globose or flattened and keeled, *thin*, subdiaphanous; whorls $3\frac{1}{2}$ –5, rapidly widening, the last hardly descending in front; lip slightly expanded or narrowly reflexed. *No hydrophanous markings*. Type *H. virgo* Brod., pl. 55, fig. 12.

Anatomy as in other *Helicostylas*. The shell differs from *Calocochlia* in being thinner without "hydrophanous" decoration. Distribution, Philippine Is., except Palawan. Arboreal.

Group of *H. reginæ*.

H. reginæ Brod., vii, 116.

smaragdina Grat.

v. *almæ* Mlldff., vii, 117.

v. *elizabethæ* Semp., vii, 117.

H. papyracea Brod., vii, 117.

? *acutangula* Burrow.

H. psittacina Dh., vii, 118.

Group of *H. virgo*.

H. virgo Brod., vii, 119.

H. dealbata Brod., vii, 119.

broderipi Rve.

H. patricia Pfr., vi, 196.

H. casta Pfr., vii, 120.

H. ægrota Rve., vii, 124.

H. samboanga H. & J., vii, 124.

zamboangæ Mts.

v. *intaminata* Gld.

H. magtanensis Semp., vii, 125.



- | | |
|-------------------------------------|--|
| H. puella Brod., vii, 120. | H. intorta Sowb., vii, 125. |
| v. lais Pfr., vii, 121. | v. crassa Mlldff., vii, 125. |
| v. subpuella Pils., vii, 121. | v. siquijorica Mlldff., vii, 125. |
| H. irosinensis Hid., vii, 121. | H. limansauensis S., vii, 126. |
| H. æruginosa Pfr., vii, 122. | H. sphæron Sowb., vii, 154. |
| H. filaris Val., vii, 122. | f. intincta Shutt., vii, 154. |
| v. nympha Pfr. | v. nana Semp., vii, 155. |
| v. tenuis Mlldff., vii, 126. | v. crassilabris Mlldff. |
| v. expansilabris Mlldff., vii, 126. | v. meridionalis Mlldff. |
| H. eydouxii Hid., vii, 123. | H. saranganica Mlldff., viii, 245. |
| v. valenciennesii Pfr., not Eyd. | H. globulosa Mlldff., Nachr., '95, 96. |
| H. broderipii Pfr., vii, 123. | H. loheri Mlldff., Nachr., '94, 115. |

Section *Crystallopsis* Ancey, 1887.

Crystallopsis ANC., Conchol. Exch., ii, p. 23, types *H. hunteri* and *allasteri*.

Shell thin, depressed globose or depressed and keeled, translucent whitish or banded, the axis perforated, at least in the typical forms. Surface spirally striated; lip expanded. Type *H. hunteri* Cox. See pl. 55, figs. 10, 11, *H. tenimberica* Mlldff.

Jaw (of *H. conformis*) semicircular, perfectly smooth. Radula as in *Helicostyla*.

Genital system (Frontispiece, fig. 4, *H. conformis*) as in *Helicostyla*.

The shell is similar in general features to *Crassia*, but the jaw of *H. conformis* has been shown by Tapparone-Canefri to be smooth (Ann. Mus. Civ. Genov., xix, pl. 8, f. 1, 8, 15). Distribution, Solomon Is. to Moluccas.

Group of *H. lactiflua*.

- | | |
|------------------------------|-------------------------------------|
| H. hunteri Cox, vii, 105. | H. wisemani Braz., vii, 109. |
| H. allasteri Cox, vii, 106. | H. aphrodite Pfr., vii, 109. |
| allisteri Pils., typ. err. | H. anadyomene Ad. & Ang., vii, 110. |
| H. aggei Heimb., viii, 244. | H. psyche Ang., vii, 110. |
| H. subvitrea Pfr., vii, 107. | H. balcombei Cox, vii, 111. |
| H. cymodoce Cr., vii, 107. | H. woodfordi Sowb., viii, 243. |
| H. lactiflua Pfr., vii, 108. | H. tricolor Pfr., vii, 111. |
| isabellensis Souv. | v. picta Sm., vii, 112. |
| H. purchasi Pfr., vii, 108. | v. transenna Pils., vii, 112. |
| H. rossiteri Ang., vii, 109. | H. tenimberica Mlldff., viii, 244. |

Group of *H. extensa*.

- H. conformis* Fér., vii, 113. *H. najas* Pfr., vii, 115.
H. leucophthalma Pfr., vii, 113. *H. physalis* Pfr., vii, 115.
H. extensa Müll., vii, 114. *H. obliquata* Dh., vii, 116.
H. cœlaxis Pils., vii, 114.

Section *Pfeifferia* Gray, 1853.

Pfeifferia GRAY, P. Z. S., 1853, p. 110. type *H. micans* Pfr.

Shell *globose*, imperforate, the slender axis solid; *thin, brittle, uniform white and glossy*; whorls 4, the last not descending in front. Aperture *lunar*; *lip thin, acute and fragile*; columella slightly thickened, vertical, deeply inserted in the base. Animal as in *Helicostyla* generally, except that the mantle is reflexed over the acute lip.

H. micans Pfr., vii, 128. Northern Luzon.

Section *Leytia* Pilsbry, 1892.

Leytia PILS., Man. Conch., vii, p. 129 (Jan. 30, 1892).

Shell imperforate, globose, thin; whorls few (4), the last angulated at periphery; surface spirally striate, having hydrophanous cream white bands. Aperture very large; lip simple, a little expanded below; columella simple, thin, vertical, deeply inserted. Anatomy unknown.

H. fragilis Sowb., vii, 129. Island of Leyte, Philippines.
leytensis Pfr.

Section *Chromatosphæra* Pilsbry, 1892.

Chromatosphæra PILS., Man. Conch., vii, p. 169 (Jan. 30, 1892).

Shell imperforate, depressed globose, solid and opaque, *richly colored but lacking hydrophanous markings*; surface *lacking spiral sculpture*; last whorl *scarcely descending* in front; *lip blunt*, very narrowly reflexed throughout; columella subvertical, *deeply inserted*, the umbilical area covered by a concave white callus. Anatomy typical. Type *H. aurata* Sowb.

Distribution, Northern Luzon.

- H. aurata* Sowb., vii, 170. *H. lividocincta* Semp., vii, 171.
H. erubescens Semp., vii, 170. *H. pudibunda* Semp., vii, 171.
v. luteocincta Semp., vii, 171.

Section *Calocochlea* Hartmann, 1842.

Calocochlea HARTM., Erd- und Süßwasser Gasterop. Schw., p. 163, type *pulcherrima* Sowb.—*Callicochlias* AGASSIZ, 1847, and of authors.

Shell imperforate, solid, subglobose, generally with varied pattern and hydrophanous cuticle. Soft anatomy typical. Type *H. pulcherrima* Sowb., pl. 55, fig. 13.

Group of *H. cromyodes*.

- | | |
|---------------------------------------|---------------------------------------|
| <i>H. cromyodes</i> Pfr., vii, 130. | <i>H. obtusa</i> Pfr., vii, 132. |
| <i>valenciennii</i> Eyd. | <i>H. amicta</i> Rve., vii, 133. |
| <i>H. denticulata</i> Jay, vii, 131. | <i>H. decora</i> A. & R., vii, 133. |
| <i>H. albaiensis</i> Sowb., vii, 132. | <i>H. ? semirufa</i> Alb., viii, 245. |
| <i>H. tukanensis</i> Pfr., vii, 132. | |

Group of *H. pulcherrima*.

- | | |
|--|--|
| <i>H. pulcherrima</i> Sowb., vii, 133. | <i>H. lalloensis</i> Pfr., vii, 136. |
| <i>H. festiva</i> Don., vii, 134. | <i>H. angusta</i> Alb., vii, 136. |
| <i>luzonica</i> Sowb. | <i>H. princeps</i> Rve, vii, 137. |
| <i>anne</i> O. Semp. | <i>H. erythrospira</i> Mlldff, vii, 137. |
| <i>H. dubiosa</i> Pfr., vii, 135. | <i>H. generalis</i> Pfr., vii, 137. |
| <i>speciosa</i> Jay. | <i>H. chrysochila</i> Sowb., vii, 138. |
| <i>batonica</i> Rve. | <i>chrysocheila</i> Sowb. |
| <i>rolubilis</i> Rve. | |

Group of *H. polillensis*.

- | | |
|---------------------------------------|--------------------------------------|
| <i>H. polillensis</i> Pfr., vii, 138. | <i>H. andromache</i> Pfr., vii, 139. |
| <i>f. portei</i> Pfr. | <i>H. codonensis</i> Hid., vii, 140. |
| <i>f. ajax</i> Pfr. | <i>H. decipiens</i> Sowb., vii, 140. |
| <i>f. hector</i> Pfr. | |
| <i>f. peraffinis</i> Pils., vii, 139. | |

Group of *H. zonifera*.

- | | |
|--------------------------------------|---|
| <i>H. zonifera</i> Sowb., vii, 141. | <i>H. cailliaudi</i> Dh., vii, 144. |
| <i>samarensis</i> var. Semp. | <i>ferruginea</i> Lea. |
| v. <i>circe</i> Pfr., vii, 142. | <i>H. microspira</i> Pfr., vii, 145. |
| <i>purpurascens</i> Mts. | <i>H. hemisphaerion</i> Pfr., vii, 145. |
| v. <i>globosa</i> Mlldff. | <i>H. samarensis</i> Semp., vii, 146. |
| v. <i>paraleuca</i> Pils., vii, 142. | <i>H. coccomelas</i> Sowb., vii, 146. |
| <i>H. coronadoi</i> Hid., vii, 142. | <i>speciosa</i> Pfr., not Jay. |
| v. <i>pulchra</i> Pils., vii, 143. | <i>H. ponderosa</i> Pfr., vii, 147. |

- | | |
|---|---|
| H. norrisii Sowb., vii, 143. | H. luengoi Hid., viii, 245. |
| H. damahoyi Pfr., vii, 143. | H. hidalgoi Mlldff., viii, 246. |
| | <i>samarensis</i> Hid., not Semp. |
| H. chrysæme Q.& M. Nachr., '93,
175. | H. streptostoma Mlldff. Nachr., '93
176. ' |
| H. semperi Mlldff. Nachr., '93,
175. | H. trisculpta Mlldff. Nachr., '95,
97. |

Group of *H. mindanaensis*.

- H. mindanaensis Sby., vii, 148. H. harfordii Sby., vii, 148.
mindana Rve.
mindorana Hartm.

Group of *H. melanochila*.

- | | |
|---------------------------------|---------------------------------|
| H. pan Brod., vii, 149. | H. roissyana Fér., vii, 151. |
| H. depressa Semp., vii, 149. | <i>solida</i> Pfr., vii, 153. |
| <i>lignaria</i> Pfr., preoc. | <i>rossiana</i> Gray. |
| v. <i>perdepressa</i> Pils. | <i>f. lutea</i> Pils. |
| H. melanochila Val., vii, 150. | <i>f. subatra</i> Pils. |
| <i>brunnea</i> Sowb. | H. infusca Alb., vii, 152. |
| H. chlorochroa Sowb., vii, 150. | H. xanthobasis Pils., vii, 155. |
| H. matruelis Sowb., vii, 151. | H. dimera Jonas, vii, 156. |
| H. difficilis Pfr., vii, 151. | H. crossei Hid., vii, 156. |
| H. mainitensis Hid., vii, 152. | H. retusa Pfr., vii, 156. |
| H. lignicolor Mldff., vii, 153. | H. libata Rye., vii, 157. |

Section *Anira* Pilsbry, 1894.

Axina ALB., Die Hel., p. 113, 1850; v. Mart., 2d edit., p. 71,
type *H. zebuensis*. Not *Axina* Kirby, 1817 (coleoptera).

Shell imperforate, *solid, dark colored*; varying from depressed and keeled to globose turbinate; more or less covered with hydrophanous cuticle; smoothish, lacking spiral sculpture; lip narrowly or broadly reflexed. Soft anatomy as in *Helicostyla* generally. Type *H. zebuensis* Brod. (See pl. 55, fig. 14, *H. moreletiana* Pfr.).

These are ground snails, mainly confined to Luzon, Cebu and Siquijor.

- H. garibaldiana D. & S., vii, 159. H. kobelti Mlldff., vii, 160.
H. siquijorensis Brod., vii, 159. H. zebuensis Brod., vii, 161.
v pallens Mlldff. v. striatissima Pils., vii, 162.

- | | |
|------------------------------------|--------------------------------------|
| H. schadenbergi Mlldff., vii, 160. | v. gloynei Sowb., vii, 165. |
| H. pfeifferi Semp., vii, 162. | ecarinata Mlldff. |
| cumingi Pfr., preoc. | H. moreleti Pfr., vii, 165. |
| H. phloiodes Pfr., vii, 163. | H. montfortiana Pfr., vii, 165. |
| H. carbonaria Sowb., vii, 163. | H. bruguieriana Pfr., vii, 166. |
| f. rubens Mlldff. | H. beloni Jouss., Le Nat., '94, 186. |
| H. magistra Pfr., vii, 164. | |

Section *Trachystyla* Pilsbry, 1892.

Trachystyla PILS., Man. Conch., vii, 166.

Shell solid, depressed, dark colored, with a dull ashen hydrophanous cuticle; spire low; whorls few and rapidly widening; columella oblique, straight; surface dull and wrinkle malleated. Type *H. cryptica*.

Species of this group live on the ground under leaves, etc.; and while the shell differs widely from arboreal *Helicostylas*, the soft anatomy is the same. The few species inhabit eastern Mindanao, Samar, Bohol, Leyte and Luzon.

- | | |
|------------------------------|--------------------------------|
| H. cryptica Brod., vii, 167. | v. panayensis Semp., vii, 168. |
| v. latitans Brod., vii, 167. | v. tumida Mlldff. |
| ? dionacea Dh. | v. subglobosa Mlldff. |
| v. depressa Mlldff., 1893. | v. nigricans Mlldff. |
| v. cretata Brod., vii, 168. | v. cineracea Semp., vii, 168. |
| v. minor Mlldff. | H. dataensis Semp., vii, 169. |

Section *Helicostyla* Fér., (restricted).

After the removal of *Cochlodryas*, *Pachysphera*, etc., a considerable number of oblong shells grouping around *H. mirabilis*, *metaformis* and *fenestrata* remain to represent this section, the type of which is *H. mirabilis* Fér., pl. 53, fig. 7.

Group of *H. mirabilis*.

- | | |
|------------------------------|-------------------------------------|
| H. mirabilis Fér., vii, 181. | f. trichroa Pils., vii, 182. |
| formosa Wood. | v. fulgens Sowb., vii, 182. |
| galactites Lam. | H. tephrodes Pfr., vii, 183. |
| persimilis Dh. | H. ? plurizonata A. & R., vii, 183. |

Group of *H. collodes*.

- | | |
|------------------------------|---------------------------------|
| H. collodes Sowb., vii, 184. | H. thomsoni Pfr., vii, 185. |
| H. indusiata Pfr., vii, 184. | H. suprabadia Semp., viii, 246. |

Group of H. metaformis.

- | | |
|--------------------------------|------------------------------------|
| H. metaformis Fér., vii, 186. | H. fuliginata Mts., vii, 188. |
| <i>ovularis</i> Mke. | <i>fumigata</i> Semp. |
| H. rustica Mouss., vii, 187. | v. <i>nigrolabiata</i> Mlldff. |
| H. hydrophana Sowb., vii, 187. | H. lacera Pfr., vii, 189. |
| H. butleri Pfr., vii, 188. | H. rehbeini Pfr., vii, 190. |
| H. languida Pfr., vii, 189. | H. roebeleni Mlldff., Nachr., '95, |
| H. unica Pfr., vii, 189. | 98. |

Group of H. fenestrata.

- | | |
|--------------------------------|------------------------------------|
| H. montana Semp., vii, 191. | H. curta Sowb., vii, 192. |
| H. fenestrata Sowb., vii, 192. | v. <i>dilatata</i> Pfr., vii, 193. |

Section *Cochlodryas* Martens, 1860.

Cochlodryas Mts., in Die Hel., p. 176, type *H. polychroa*. *Pavcilus* ALB., mss.

Elevated, vividly colored species lacking hydrophanous cuticle, and with a distinct subsutural band which is generally white. Type *H. polychroa*, (= *viridostriata*) pl. 53, fig. 10.

- | | |
|---------------------------------|------------------------------------|
| H. florida Sowb., vii, 177. | H. orbitula Sowb., vii, 179. |
| <i>helicoides</i> Pfr. | <i>chlorogrammica</i> Val. |
| H. viridostriata Lea, vii, 178. | H. tenera Sowb., vii, 179. |
| ? <i>smaragdus</i> Beck. | H. ignobilis Sowb., vii, 180. |
| <i>polychroa</i> Sowb. | H. boettgeriana Mlldff., vii, 181. |

Section *Orustia* Mörch, 1852.

Orustia MORCH, Cat. Yoldi, p. 15, in part, first species *H. monticula*.

Shell imperforate, turbate-globose, not spirally striated, banded, with hydrophanous cuticle; lip thin, narrowly reflexed; columella, vertical, deeply entering. Anatomy typical. Type *H. monticula*, pl. 54, fig. 5 (see also pl. 53, fig. 1, *H. versicolor*).

Distribution, Luzon.

- | | |
|-------------------------------|-----------------------------------|
| H. monticula Sowb., vii, 176. | H. versicolor Mlldff., viii, 246. |
| H. pulchella Mlldff., Nachr. | H. strigata Mlldff. Nachr. '95, |
| ['93, 176. | ['97. |

Section *Pachysphæra* Pilsbry, 1894.

Pachysphæra PILSB., Man. Conch. vii, p. 172 (Jan. 30, 1892).

Shell *small, globular or globose-elevated, solid, brightly colored; lacking hydrophanous cuticle and spiral striæ.* Type *H. spherica* Sowb.

Confined to north-western Luzon.

- | | |
|-------------------------------------|--|
| <i>H. spherica</i> Sowb., vii, 172. | <i>H. iloconensis</i> Sowb., vii, 175. |
| <i>H. balteata</i> Sowb., vii, 173. | v. <i>heterotæniata</i> Pils. |
| <i>H. annulata</i> Sowb., vii, 174. | v. <i>xanthotæniata</i> Pils. |
| | v. <i>intensor</i> Pils. |

Section *Columpica* Hartmann, 1842.

Ptychostylus MLLDFF., Nachrichtsbl. D. M. Ges. 1888, p. 74.—Not *Ptychostylis* Gabb, a group of *Trochidae*. Not *Ptychostylus* Sandberger, Land- u. Süswasser-Conch. der Vorwelt, p. 58 (*Melaniidae*) *Stylodonta* (in part) of authors.—*Columpica* (in part) HARTMANN, Gasterop. Schweiz, p. 187, 188 (*H. uniplicata* and *H. dolium*=*cepodides*).—*Hypoptychus* PILSBRY, Proc. Acad. Nat. Sci. Phila., 1892 p. 395, footnote.

Shell globose-turbinate, formed of *many closely coiled whorls*, the surface having hydrophanous cuticle; aperture narrowly lunar; columella spirally twisted, *having a strong tooth-like fold at the base*.

Animal externally like *Cochlostyla*, internal anatomy unknown.

A peculiar and isolated type resembling *Stylodonta unidentata* of the Seychelles Islands. It was first classed in *Cochlostyla* by Semper. The name *Ptychostylus* being preoccupied, the writer proposed to substitute *Hypoptychus*; but it seems best to revert to Hartmann's *Columpica*.

- H. cepoides* Lea, vii, 194. *Island of Luban.*
dolium Hartm.

Section *Helicobulinus* Broderip, 1840.

Helicobulinus BROD., P. Z. S. 1840, p. 123, type *H. sarcinosa*.—*Helicobulinus* MOLLENDORFF, Landschn. Cebu, p. 241.—*Chromocochlea* HARTMANN, Gast. Schweiz, p. 137, 1844, type *C. turbinoides*.—*Chromatocochlias* AGASSIZ.

Shell capacious, *turbinate-globose, solid, variegated with green or brown, covered with a variously patterned hydrophanous cuticle.*

Columella more or less folded. Type *H. sarcinosa*. (See pl. 53, fig. 2, *H. turbinoides*).

This section, while closely allied to *Orthostylus*, presents affinities with so many groups that it must be regarded as an intermediate or synthetic type.

- | | |
|-------------------------------------|--|
| <i>H. grandis</i> Pfr., vii, 195. | <i>H. turbinoides</i> Brod., vii, 196. |
| <i>colossea</i> Pfr. | <i>H. cinerascens</i> Pfr., vii, 197. |
| <i>carolus</i> Dh. | v. <i>turbo</i> Pfr., vii, 197. |
| <i>H. sarcinosa</i> Fér., vii, 195. | <i>H. bembicodes</i> Pfr., vii, 198. |
| v. <i>turgens</i> Dh., vii, 196. | |

Section *Orthostylus* Beck, 1837.

Orthostylus BECK (in part), Index, p. 49.—MARTENS in Alb. Die Hel. p. 177.—v. MLLDFF., Landschn. Cebu, p. 242.—*Pithohelix* SWAINS., Malacol., p. 166.—*Pythohelix* SWAINS., l. c., p. 332.

The shell is generally large, solid, ovate-conic, covered with a variously patterned hydrophanous cuticle. Aperture oblique, ovate; lip reflexed; columella nearly vertical, more or less obviously folded below. Anatomy typical. Type *H. pithogaster*, pl. 53, fig. 3.

The present section is allied to *Helicobulinus*, which consists of more inflated shells, and to *Hypselostyla*, containing more elongated forms. The limits of *Orthostylus* are not easy to determine, as there are species almost or entirely intermediate between this group and *Helicostyla*, as well as forms connecting with *Hypselostyla*. With the exception of Mindoro and Mindanao, it occurs on all the Philippine group.

- | | |
|--|--------------------------------------|
| <i>H. bicolorata</i> Lea, vii, 199. | <i>H. ticaonica</i> Brod., vii, 203. |
| <i>alberti</i> Brod. | <i>B. subglobosus</i> Lea. |
| v. <i>onyx</i> Brod., vii, 199. | <i>f. lutea</i> Pils. |
| <i>H. imperator</i> Pfr., vii, 199. | <i>H. lignaria</i> Pfr., vii, 204. |
| <i>H. pithogastra</i> Fér., vii, 200. | <i>H. gilva</i> Brod., vii, 205. |
| <i>f. philippinensis</i> Pfr., vii, 201. | <i>H. woodiana</i> Lea, vii, 206. |
| ? <i>strigatu</i> Mlldff. | <i>reevii</i> Brod. |
| <i>f. bipartita</i> Pils. vii, 201. | <i>reevei</i> Pfr. |
| <i>H. villari</i> Hid., vii, 201. | <i>H. portei</i> Pfr., vii, 207. |
| <i>f. ventricosa</i> Mlldff. | <i>portii</i> Pfr. olim. |
| <i>H. daphnis</i> Brod., vii, 201. | <i>H. rufogastra</i> Less, vii, 207. |
| <i>H. cunctator</i> Rv., vii, 202. | <i>B. monozonus</i> Pfr. |
| <i>H. faunus</i> Brod., vii, 203. | <i>H. macrostoma</i> Pfr., vii, 208. |

- | | |
|--------------------------------|-----------------------------------|
| H. vidali Hid., vii, 208. | H. nux Semp., viii, 5. |
| H. juglans Pfr., vii, 208. | H. marinduquensis Hid., vii, 209. |
| <i>f. olivacea</i> Mlldff. | <i>woodianus</i> Pfr. not Lea. |
| <i>f. roseolimbata</i> Mlldff. | H. amalix Mlldff., viii, 245. |

Elongated Orthostylus.

- | | |
|------------------------------------|--------------------------------|
| H. mus Brod., viii, 6. | H. ventricosa Chem., viii, 10. |
| H. leucophæa Sowb., viii, 6. | <i>nobilis</i> Rve. |
| H. glaucophthalma Pfr., viii, 7. | <i>f. guimarasensis</i> Rve. |
| H. senckendorffiana Pfr., viii, 7. | <i>f. decorata</i> Fér. |
| H. solida Pfr., viii, 8. | <i>f. frater</i> Fér. |
| H. pictor Brod., viii, 8. | H. satyrus Brod., viii, 13. |
| <i>B. labropurpureus</i> Grat. | v. palawanensis Pfr. |
| H. solivaga Rve., viii, 9. | v. cyanocephala Pils. |
| H. leopardus Pfr., viii, 9. | v. cinerosa Pfr., viii, 15. |
| H. aplomorpha Jonas, viii, 11. | v. graellsii Hid., viii, 14. |
| H. fulgetrum Brod., viii, 12. | v. librosa Pfr., viii, 12. |
| ? <i>Bul. antipodarum</i> Gray. | H. cæsar Pfr., viii, 15. |
| | H. fischeri Hid., viii, 29. |

Section *Hypselostyla* Martens, 1868.

Hypselostyla Mts., in PFR., Monogr. Hel. Viv. vi, p. 7, 16, for *nympha* and *dactylus*.

Shell *imperforate, narrow and elongated*, usually rather thin and somewhat keeled at periphery; peristome narrowly expanded. (See pl. 53, fig. 6, *H. connectens* Mlldff.).

Distribution, central Philippines.

- | | |
|------------------------------------|------------------------------------|
| H. cinninna Sowb., viii, 16. | <i>f. möllendorffi</i> Hid. |
| <i>labiozonalis</i> Grat. | H. evanescens Brod., viii, 20. |
| <i>pastorella</i> Val. | H. eburnea Rve., viii, 20. |
| v. gracilis Lea. | H. nimbose Brod., viii, 21. |
| v. virens Pfr. | <i>B. Pfeifferianus</i> Rve. |
| v. spretus Rv. | H. elegans Semp., viii, 21. |
| v. romblonensis Pfr. | <i>siquijorensis</i> Pfr., preoc. |
| H. groulti Juss. Le Nat. '94, 136. | H. carinata Lea, viii, 22. |
| H. succincta Rve., viii, 17. | <i>dactylus</i> Brod. |
| H. cincinniformis Sby., viii, 18. | v. <i>nympha</i> Pfr., viii, 23. |
| H. carneola Grat., viii, 19. | H. turris Semp., viii, 23. |
| H. subcarinata Pfr., viii, 19. | H. diana Brod., viii, 24. |
| | <i>f. calista</i> Brod., viii, 24. |

- H. calypso* Brod., viii, 25. *H. hainesi* Pfr., viii, 26.
H. camelopardalis Brod., viii, 25. *H. accedens* Mlldff. Nachr.
 v. *boholensis* Brod., viii, 26. [’95, 99.
 v. *connectens* Mlldff.

Group of H. concinna.

- H. concinna* Sowb., viii, 27. *H. incompta* Sowb., viii, 28.
 v. *flamula* Semp., viii, 27. *H. pyramidalis* Sowb., viii, 28.
H. acuminata Sowb., viii, 28. *nebulosus* Pfr., viii, 29.

Section *Papustyla* Pilsbry, 1893.

Papustyla PILS., Man. Conch. viii, p. 243, July 1, 1893.

Shell rimate or imperforate, elongated, with slender spire; peristome expanded. Distribution, New Guinea, New Britain group.

- H. translucida* Q. & G., viii, 29. *H. hindei* Cox, viii, 30.
H. papuensis Hedl., vii, 190. *H. heimbürgi* Branc., viii, 30.

Section *Eudoxus* Albers, 1850.

Eudoxus ALB., Die Hel., p. 137; edit. v. Mart., p. 179. type *B. effusus* Pfr.

Shell ovate or ovate-conic, imperforate, smooth, shining, very light colored, generally thin and destitute of hydrophanous cuticle. Columnella rather narrow, its face flattened. Type *H. effusa* Pfr., pl. 53, fig. 11.

Distribution, Marinduque, Luzon, Romblon, Burias.

- | | |
|---------------------------------------|--------------------------------------|
| <i>H. effusa</i> Pfr., viii, 31. | <i>H. virginea</i> Lea, viii, 36. |
| <i>f. fasciata</i> Pils. | <i>bullula</i> Brod. |
| <i>H. halichlora</i> Semp., viii, 32. | <i>albinus</i> Grat. |
| <i>H. leai</i> Pfr. viii, 32. | <i>chloroleuca</i> Mart. |
| <i>H. jonasi</i> Pfr., viii, 32. | <i>bustoi</i> Hid. |
| <i>albersi</i> Pfr. | <i>H. hololeuca</i> Pfr., viii, 37. |
| <i>buschi</i> Pfr. | <i>H. smaragdina</i> Rve., viii, 37. |
| <i>perdita</i> Rve. | v. <i>nigrescens</i> Semp. |
| <i>breviculus</i> Rve. | v. <i>lutea</i> Semp. |
| ? <i>leai</i> Pfr. | v. <i>striata</i> Semp. |
| <i>H. simplex</i> Jonas, viii, 33. | v. <i>zonifera</i> Semp. |

- | | |
|------------------------------|-------------------------------|
| H. quadrasi Hid., viii, 34. | H. straminea Semp., viii, 39. |
| <i>cossmanniana</i> Cr. | H. cumingi Pfr., viii, 39. |
| H. modesta Sowb., viii, 35. | H. ægle Brod., viii, 40. |
| <i>B. hindsii</i> Pfr. | v. barandæ Hid., viii, 40. |
| <i>B. verecundus</i> Rve. | H. oviformis Semp., viii, 40. |
| H. belcheri Pfr., viii, 35. | H. uber Pfr., viii, 41. |
| <i>B. hindsii</i> Rve. | H. phæostyla Pfr., viii, 41. |
| H. lacerata Semp., viii, 36. | |
| <i>paradoxa</i> Semp., olim. | |

Section *Phengus* Albers, 1850.

Phengus ALB., Die Hel., p. 137, for *B. opalinus* and *B. evanescens*.—V. MART., Die Hel., 1860, p. 180, type *H. opalina*.

Shell thin, pale green, distinctly trochoidal, and with no hydrophanous cuticle. Type *H. opalina* Sowb., pl. 53, fig. 5.

These shells have the texture and color of *Eudoxus*, but differ in their trochiform contour. Anatomically, *Phengus* forms a transition to *Canistrum*, the dart sack being small and without a dart, and the globular mucus gland is much reduced in size.

- | | |
|-----------------------------|----------------------------|
| H. opalina Sowb., viii, 42. | H. dumonti Pfr., viii, 42. |
|-----------------------------|----------------------------|

Section *Canistrum* Mörch, 1852.

Canistrum MORCH, Catal. Yoldi, p. 31.—PILS., Manual viii, p. 43.

Shell ovate-conic or oblong, imperforate and solid; banded; with or without hydrophanous cuticle; surface microscopically spirally striated; whorls narrow; lip well expanded; columella vertical. Type *H. ovoidea* Brug., pl. 53, fig. 4.

Genital system as in *Helicostyla* except that the dart sack and mucus glands are absent (pl. 54, fig. 1, *H. stabilis*).

That the simplicity of the generative system is probably the result of degeneration of the dart apparatus is shown by the approach to this condition in *Phengus*. The anatomy of *Canistrum* is otherwise as in *Helicostyla*. It is very desirable that more species be examined anatomically, for intermediate stages of development. When *Prochilus* and *Chrysallis* are dissected, their anatomy may throw light upon the condition of *Canistrum*.

- | | |
|-----------------------------|-----------------------|
| H. ovoidea Brug., viii, 43. | <i>costerii</i> Eyd. |
| <i>luzonicus</i> Sowb. | <i>euryzonus</i> Pfr. |

- | | |
|--------------------------------|------------------------------|
| H. balanoidea Jonas, viii, 44. | H. brevicula Pfr., viii, 45. |
| H. stabilis Sowb., viii, 45. | H. velata Brod., viii, 12. |
| | v. elongata Mlldff. |

Section *Prochilus* Albers, 1860.

Prochilus ALB., Die Hel., p. 179, type *Bul. virgatus*.

Shell narrowly perforated, of an elongated ovate-pyramidal long-spined form, smooth and shining. Aperture less than half the length of shell; peristome very broadly reflexed. Soft anatomy unknown. Type *H. virgata* Jay, pl. 53, fig. 9.

Strikingly handsome elongated shells, confined to Mindoro and the Cuyos Is.

- | | |
|--|---------------------------------|
| H. calobapta Jonas, viii, 46. | H. virgata Jay, viii, 48. |
| cuyoensis Rve. | labrella Grat. |
| H. cuyoensis Pfr., viii, 47. | v. porracea Jay. |
| H. fictilis Brod., viii, 47. | v. sylvanoides Semp. |
| v. larvata Brod., viii, 48. | v. pulchrior Pils. |
| H. nigrocincta Semp., viii, 50. | H. dryas Brod., viii, 49. |
| pan Pfr., not Brod. | paradoxus Pfr. |
| H. mercurius Pfr., viii, 50. | H. partuloides Brod., viii, 50. |
| H. calamianica Q. & M., Nachr., '95, 99. | |

Section *Chrysallis* Albers, 1850.

Chrysallis ALB., Die Hel., p. 140 (in part).—v. Mart., Die Hel., 1860, p. 179, type *B. chrysalidiformis*.

Shell perforated, elongated ovate-conic, solid, opaque and not smooth; aperture ovate, less than half the shell's length; lip broadly expanded; columellar margin dilated and reflexed; hydrophanous cuticle usually present. Soft anatomy unknown. Type *H. chrysalidiformis* Sowb., pl. 53, fig. 8.

Evidently allied to *Prochilus*. Inhabits Mindoro only.

- | | |
|-------------------------------------|----------------------------------|
| H. chrysalidiformis Sby., viii, 51. | H. mindoroensis Brod., viii, 52. |
| v. ustulata Jay. | wagneri Grat. |
| v. antonii Semp. | aspersus (part) Grat. |
| H. electrica Rve., viii, 53. | melanogaster Mörch. |
| lichenifer Mörch. | |
| f. cailliaudi Petit. | |

Genus LEUCOCHROA Beck, 1837.

Leucochroa B., Index Moll., p. 16, in part (keeled *Xerophila*, etc., with *L. cariosa*, *cariosula*, *candidissima*).—MORCH, Cat. Yoldi, p. 5, 1852, Mal. Bl. iv, p. 109.—KOBELT, Nachrbl. 1875, p. 37; Iconogr. Land- u. Süßwasser-Moll. n. ser., iii, p. 29.—*Calcarina* Moq. TAND., Mém. Ac. Toulouse, iv, 1848, and Moll. Fr. ii, p. 69 (not *Calcarina* d'Orb.).

Shell *solid and strong, chalky, white*, subglobose or depressed, and keeled, at least when young; axis hollow, often closed in the adult; surface smoothish or pitted; embryonal shell consisting of about $1\frac{1}{2}$ smooth whorls; last whorl generally deflexed in front. Aperture small, half-round, oblique; *lip blunt and simple* (in section *Sphincterochila* much contracted) the columellar insertion dilated, ends remote. Type *L. candidissima*, pl. 56, fig. 13 (see also pl. 56, figs. 14, 15, *L. cariosa*).

Animal with rather small foot; upper surface coarsely granular, with a pair of dorsal grooves; facial grooves indistinct; no foot margin, caudal pore or longitudinal line on the tail. *Sole distinctly tripartite*, the middle area wide, side areas narrow, meeting at tail. Mantle-edge rather thick, with very rudimentary right and left body lappets. *Right eye retractor passing to the left of the genitalia*, not between its branches.

Jaw (pl. 36, fig. 14, *L. candidissima*) solid, arcuate, with a low median projection, *its surface entirely smooth*.

Radula of the type usual in *Helicidae*. Middle tooth with square basal plate shorter than the large mesocone; side cusps absent. Lateral teeth similar but asymmetrical. Marginals with shorter basal plate, the inner cusp (ento- *plus* mesocone) bifid, ectocone small, simple or bifid (pl. 36, fig. 13, *L. candidissima*. Pl. 36, fig. 16, *L. boissieri*).

Genitalia (pl. 36, fig. 15, *L. batika*; pl. 57, figs. 52, 53, *L. candidissima*): penis very short, narrowing into a much twisted epiphallus, upon which below, the retractor muscle is inserted; terminating in a flagellum and vas deferens. Vagina stout, bearing a flattened spiral, or an elongated gland upon a slender short duct; spermatheca duct long, its lower half convoluted upon the base of the uterus, to which it is closely bound; bearing a short stouter diverticulum, the end of which is sunken in the uterus; upper portion of the spermatheca duct slender, straight, bound to the uterus

and terminating in a globular spermatheca (pl. 57, fig. 53, duct dissected away from uterus and straightened). *Ovo-testis very large and compact, completely occupying the earlier 1½ whorls.*

Distribution, circum-Mediterranean region. The area occupied by this genus is the same as that of *Otala plus* Levantina, being coincident with the region where the olive grows. As in *Macularia* one species (*vermiculata*) extends throughout the range of the group, so in *Leucochroa*, *L. candidissima* has an equally wide distribution, occurring in Palestine (v. *hierochuntina*), northern Africa and westward in Europe to southern Spain. The other species are all local. Many of them show not only much individual variation, but also numerous well-marked local varieties; and the complete tale of these has not yet been told.

This genus is distinguished by its cretaceous solid shell, conspicuously tripartite sole, smooth jaw and the teeth and genitalia of *Helix*, except that the dart sack is wholly absent, the mucous appendages reduced to one straight or coiled sacculated gland, and the ovotestis not enveloped in the digestive gland.

The group has had a varied literary existence, Moquin-Tandon, in 1848, removing it from the Helices to Zonites on account of the smooth jaw; and later systematists, Martens, Westerlund, Kobelt and others have adopted this view in their several works. Binney, upon examining the teeth of *L. boissieri*, declared it a *Helix*, and has been followed by Fischer and Tryon. It only remains to say that there can be no doubt that *Leucochroa* belongs to the belogonous Helicidæ, and has not the slightest affinity to the Zonitidæ. It is more nearly allied, in the peculiar position of the eye retractor, to *Helicella* than to other genera, but differing in the loss through degeneration of the dart and its sack, and in the smooth jaw—both of these being purely secondary modifications. I have retained the genus in *Belogona euadenia* on account of the sacculated mucus gland of *candidissima*; but a careful dissection of some species with elongated mucus gland, like *batica*, should be made, with histological examination of the mucus gland and the minute spur at its middle (see pl. 36, fig. 15), to ascertain more certainly the place of the genus. Probably the spur mentioned is a remnant of the dart sack. The anatomy is known by Schmidt's figures representing '*candidissima*, *batica*, *cariosa* and *cariosula* (= *hispanica*), and the writer's dissection of *candidissima*.

Two sections are recognized, *Leucochroa*, with the lip simple, type *candidissima*, and *Sphincterochila* Anc., with the mouth angular, much contracted by an inward thickening of the lip, and a bifid nodule in the posterior angle.

Section *Leucochroa* Beck.

- | | |
|--|---------------------------------------|
| L. <i>candidissima</i> Drap., iii, 10. | L. <i>cariosula</i> Mich., iii, 13. |
| <i>f. rimosa</i> C. & J. | L. <i>fimbriata</i> Bgt., iii, 12. |
| <i>v. hierochuntina</i> Boiss. | <i>v. myopa</i> West. |
| <i>v. sardoa</i> Malz., viii, 55. | <i>v. illicita</i> Mss. |
| <i>sarda</i> Kob., on pl. | <i>v. varicosula</i> West. |
| L. <i>isserica</i> Kob., viii, 57. | L. <i>debeauxi</i> Kob., viii, 55. |
| L. <i>bætica</i> Rossm., iii, 11. | L. <i>mayrani</i> Gass., iii, 13. |
| <i>v. alexandrina</i> Fag., iii, 11. | <i>v. subcariosula</i> Bgt., iii, 13. |
| <i>v. tunetana</i> Let. & Bgt. | <i>kobeltiana</i> Deb. |
| L. <i>otthiana</i> Fbs., iii, 11. | L. <i>octinella</i> Bgt., viii, 55. |
| <i>v. thayaca</i> Bgt., iii, 11. | <i>vetula</i> West. |
| <i>v. titanodolena</i> Pch., iii, 11. | L. <i>hispanica</i> West., viii, 56. |
| <i>v. jeannotiana</i> Terv., iii, 11. | L. <i>saharica</i> Deb., viii, 56. |
| <i>Zonites piestius</i> Bgt. | L. <i>cariosa</i> Oliv., iii, 13. |
| <i>v. chionodiscus</i> Pfr., iii, 11. | <i>v. amphicyrta</i> Bgt. |
| L. <i>spiranomala</i> Bgt., viii, 55. | <i>v. nazarensis</i> Mouss. |
| <i>speiranomala</i> Bgt., in Pech. | <i>v. crassocarina</i> Mouss. |
| L. <i>argia</i> Bgt., iii, 12. | L. <i>ultima</i> Mouss., iii, 14. |
| L. <i>adanensis</i> Naeg., viii, 57. | L. <i>pressa</i> Mouss., iii, 14. |
| L. <i>prophetarum</i> Bgt., iii, 12. | L. <i>accola</i> Mouss., iii, 14. |

Section *Sphincterochila* Ancey.

Mima WESTERLUND, Fauna Palaäret. Binnenconch., i, p. 88, 1886 (for *boissieri* and *filia*). Not *Mima* Meigen, Diptera, 1820.—*Sphincterochila* ANCEY, Conch. Exch., Aug., 1887, p. 23 (for *filia* and *boissieri*).

Shell solid white and chalky like *Leucochroa*; but the aperture is contracted by a building inward of the lip on its outer margin and at the sutural angle. Jaw and teeth as in *Leucochroa*. Type *L. boissieri*, pl. 56, figs. 11, 12.

Distribution, Palestine and northern Arabia.

- | | |
|--------------------------------------|----------------------------------|
| L. <i>boissieri</i> Charp., iii, 14. | L. <i>filia</i> Mouss., iii, 15. |
| <i>v. zonata</i> Bgt. | |

BELOGONA SIPHONADENIA.

Dart-bearing *Helices* in which the mucus glands are tubes of equal diameter throughout, inserted directly upon the vagina, never upon the dart sack.

This definition, while it perfectly distinguishes the group under consideration from the *Euadenia* (p. 175), in which the mucus apparatus consists of glandular lobes, flat or globular, and with few exceptions inserted on the dart sack, will not cover all forms referred to *Siphonadenia*. The diagnosis-defying process of retrogressive evolution or degeneration has produced forms in which the dart apparatus and mucus glands have dwindled to a mere vestige, or been entirely lost; reverting to the condition found in the *Epiphallagona*, which as I have elsewhere attempted to show, were the stock whence *Belogona* arose. In these cases recourse must be had to such other organs as have not shared the degenerative process; to less divergent species, and to embryology for clues to the true history of doubtful forms. We cannot too strongly insist upon the recognition of that great difference between a *primitive structure* and similar structure produced by a reverse process from a more complicated organ. To lose sight of this would be to lose the best message these studies can bring us, and reduce systematic zoology to a mere index.

Fortunately, we have in the recent fauna, a considerable number of species showing clearly the various stages of degeneration which have resulted in those simplified forms of the genera *Helicella* and *Hygromia* which will be found noticed in the account of those groups. The evidence indicates that such forms as *Ciliella*, *Metafruticicola*, *Cochlicella*, etc. are recent degenerate groups, quite independently produced from at least four normal *Belogonous* types. It is noteworthy that the penis, jaw, radula and shell show no retrogressive features in these forms, but retain the characters normal for the genera they are believed to have descended from. The penis is not (as von Ihering states) of the *Patula* type (*Haplogona*), but is distinctly of the form normal in *Belogona* and *Epiphallagona*.

All recent *Helices* of Europe (except the *Pyramidulas*) belong to this division of the *Belogona*, and the same is probably true of the Tertiary fossil forms. Just as anatomical data have enabled us to eliminate the foreign group *Triodopsis* from this fauna, so more philosophical study must cause us to see in the supposed *Corasia*, *Chloritis*, *Obba*, *Pella*, *Charopa*, *Mesodon*, *Coryda*, etc. of the tertiary,

merely the ancestors of groups now living in Europe, and lateral branches of those phyla. The presence of snails belonging not only to modern *genera*, but to modern *subgeneric* or *sectional* groups, as low as the lower Miocene, indicates that for the roots of even these weakly characterized divisions, we must look still earlier; and the large spaces of Eocene time can scarcely be held sufficient for the differentiation of the genera now occupying the European tract. The absence of *Belogona Siphonadenia* from all regions except those now occupied by that group is negative evidence tending toward the view that the group developed its special peculiarities in that quarter of the world; and while this sort of evidence is always inconclusive, it has some weight in the total absence of facts making against it. A provisional hypothesis might be outlined, holding that the primitive *Belogona* (with the genital structure like *Helicostyla*) spread westward before or at the beginning of Eocene time, and in the Eur-African tract the stock became modified by the removal of the mucus glands from the dart sack, and their change into the tubular form, into the siphonadenious type; subsequently splitting into a considerable number of genera. Those genera which have spread again from this center are mainly minute forms capable of living in cold regions, such as *Vallonia* and *Acanthinula*; but the presence of *Helicodonta* and *Metodontia* in China, and of the East Asian genus *Eulota* in Europe, indicates a more southern connection also. These exchanges between the faunas of the east and west extremes of the Palearctic continent are remarkably few, however; and we are compelled to believe that since the incursion which brought *Belogona* and many other Oriental types to Europe, the climatic or other conditions prevailing in Central Asia and Siberia have been unfavorable to the spread of land mollusks.

Of course there is no reason to believe that *Helices* of the Epiphallagonous type did not also reach Europe with or before the *Belogona*; and they may have survived there during Eocene and even Miocene times; in fact the genera *Dentellocaracolus*, *Fridolinia*, etc., may represent such survivors. But to state that this is the case, or that those genera belong to the Epiphallogona (i. e. are related to *Caracolus*, *Obba*, *Chloritis*, etc.) is merely to state one's pleasingly sensational flights of fancy as scientific truth. The evidence showing the presence of Epiphallogona in Europe at any time, rests now upon the finding of certain rather heavy, rudely sculptured forms; but they are neither heavier nor more coarsely wrinkled than some Hemi-

cyclas, and may as readily have belonged to Belogona as to Epiphalllogona, for anything now known; and while we should not at the present stage of malacology deny the presence in European Eocene and Miocene of genera allied to *Obba*, *Caracolus* (= *Pleurodonte*), etc., neither should palæontologists lightly affirm that "*Geotrochus*," *Obba*, *Chloritis*, etc., exist in European Tertiary, on the strength of mere resemblances of contour and sculpture—characters of no systematic value, and now abandoned by all helicologists in studying recent Helices.

Synopsis of recent genera.

1. Dart-sack 1; mucus glands 2 or in 2 clusters; spermatheca on a very long duct, usually with diverticulum; shell usually conspicuously banded.
 - a. Jaw with strong, convex vertical ribs; dentition normal.
 - b. Dart four-bladed; diverticulum free when present; shell typically five-banded, *Helix*.
 - bb. Dart two-bladed; diverticulum always present, united by a wide membrane to uterus; shell none to three banded, *Helicigona*.
 - aa. Jaw with converging flattened ribs; dentition normal, *Leptaxis*.
 - aaa. Jaw smooth; teeth all unicuspid and strap-shaped, *Allognathus*.
2. Dart sack 2, 1 or 0, the dart bladeless or two-bladed; mucus glands 0, 1, or several, rarely more than 2-branched; spermatheca duct short, with no diverticulum; shell with many or no bands.
 - a. Right eye-retractor passing between branches of genitalia, shell unicolored or 1-banded, rather corneous in texture.
 - b. Shell with well-reflexed and thickened lip, often toothed, *Helicodonta*.
 - bb. Shell with simple or expanded lip, texture corneous, aperture lunate.
 - c. Depressed-globose or depressed, not laminate, size moderate or small, *Hygromia*.
 - cc. Conoidal, with costate or lamellar riblets; minute, *Acanthinuia*.
 - bbb. Aperture round, oblique, toothless; shell minute, depressed, few-whorled, *Vallonia*.

- aa. Right eye-retractor passing to left of genitalia; shell more
or less chalky; lip simple or expanded, *Helicella*.
? *Geomitra*.

This order of groups is reversed in the following pages.

Genus GEOMITRA Swainson, 1840.

= *Geomitra* SWAINS., + *Plebecula*, *Helicomela*, *Lemniscia*, *Hispidella*, *Spirorbula*, *Irus*, *Actiuella*, *Rimula*, *Cullina*, *Caeolus*, *Hystericella*, *Discula*, *Tectula*, *Placentula*, *Coronaria* and *Craspedaria* of LOWE, 1852-1854, + *Ochthephila* BECK, 1837, not Fallén, 1823, + *Heterostoma* HARTM., 1841 to '44, + *Turricula* WOLLASTON, 1878, not of H. & A. Adams, 1856.

Shell generally solid, rather cretaceous, unicolored or from one to three banded: varying from globular or pyramidal to lens-shaped or planorboid, the umbilicus open or closed. Aperture half-round or circular; lip more or less expanded, at least at the columella, usually thickened within, but having no lip-rib as in *Helicella* columella dilated or reflexed. Type *G. tiarella* W. & B. (See pl. 68, figs. 1-19).

Jaw low, slightly arcuate, with 15 broad, flat, crowded ribs in *tiarella*, about 8 broad, separated ribs in *turida*. In *abjecta* there is a blunt median projection but no ribs.

Radula (pl. 67, fig. 18, *G. abjecta* Lwe.; pl. 70, fig. 40, *G. turida* Lwe.) having well-developed side-cusps on middle teeth, the middle cusp about as long as the basal-plate. Lateral teeth bicuspid. Marginals with the inner cusp long, oblique, and feebly bifid, outer cusp bifid or even trifid.

Distribution: Madeira group of islands. Only the most unsatisfactory evidence exists to give ground for believing this genus to occur outside of the Madeira group, except as occasional immigrants, unless the occurrence of *G. paupercula* Lowe in the Azores and Canaries be owing to natural causes. Those indigenous species of the Canaries referred to *Hispidella*, *Discula*, *Ochthephila*, etc., may better be left in *Hygromia*, *Jacosta* and other groups, until they may be shown to actually have some characters of the Madeira forms. The Canary Island Helix fauna is far more closely allied to that of northern Africa than to that of Madeira.

It would obviously be quite idle to discuss the origin or genesis of this genus until its anatomy is made known. We are quite safe in

believing it an ancient inhabitant of the Madeira group, and its peculiarities have probably been developed upon that soil, for neither in the fossil series of Europe or the recent fauna of Eur-Africa or the other Atlantic islands are there known forms which may be referred to the Madeira genus. It is therefore much more restricted than the *Leptaxis* group. In this connection *conf.* WATSON, The Journal of Conchology, vii, p. 1, 1892.

A large number of subgenera or sections have been founded for the Madeira Helices, which is not surprising when we consider the astonishing amount of modification of the numerous minor groups, altogether unparalled in any other tract of like extent in the world. Most of the following sectional groups have already been associated by Martens, Pfeiffer and others; but *Plebecula*, *Helicomela* and *Hispidella* are now added to the group for the first time.

The name *Ochthephila* being preoccupied, I have been obliged to substitute Swainson's term *Geomitra*. This has priority over *Heterostoma* Hartmann, as well as over the entire series of names proposed by Lowe.

Subgenus PLEBECULA Lowe, 1852.

Plebecula LWE., Ann. Mag. Nat. Hist. (2), ix, p. 114, Feb., 1852, for *giramica*, *vulgata*, *canicalensis* Lwe.; P. Z. S., 1854, p. 172, type *H. vulgata* Lwe.—*Helicomela* LWE., P. Z. S., 1854, p. 172, type *H. punctulata* Sowb.

Shell *globose-depressed* with conic spire, or *subglobular*, umbilicate or imperforate, solid, above rather rudely striated, granose or hirsute; unicolorous, or 3-banded above on a brown ground, the base paler and uniform. Whorls 5-6, separated by deep sutures. Aperture but little oblique, *subcircular*; lip hardly expanded, sharp or thickened within; columella reflexed. Type *G. nitidiuscula* Sowb. (See pl. 43, fig. 26, *G. punctulata* Sowb.).

(Shell subglobular, imperforate; *Helicomela*).

G. punctulata Sowb., iv, 187.
v. *avellana* Lwe., iv, 187.

G. bowdichiana Fér., iv, 187.
vargasiana Pfr.

(Shell depressed-globose with conic spire, umbilicate; *Plebecula*).

- | | |
|---------------------------------|-------------------------------------|
| G. nitidiuscula Sowb., iv, 188. | G. nitidiuscula. |
| <i>vulgata</i> Lwe. | v. saxipotens Woll. |
| v. giramica Lwe., iv, 188. | v. canicalensis Lwe., iv, 188. |
| <i>anaglyptica</i> Rv. | G. lurida Lwe., iv, 188. |
| v. deserticola Woll. | <i>nitidiuscula</i> Woll., not Sow. |
| v. pulchra Paiva. | v. hartungi Alb., iv, 189. |

Subgenus LEMNISCIA Lowe, 1854.

Lemniscia LWE., P. Z. S., 1854, p. 170, type *H. michaudii* Dh.

Shell barely perforate, nowhere granular, globose-conoid or globose-depressed, with numerous ($6\frac{1}{2}$ to 8) slowly widening whorls, those of the spire striated; last whorl but little descending, the base smooth. Aperture half-round, lip blunt, thickened within, expanded toward the columella, its ends remote, parietal wall nude. Type *G. michaudii* Dh., pl. 68, figs. 14, 15.

- | | |
|---------------------------|---------------------------|
| G. michaudii Dh., iv, 21. | G. calva Lwe., iv, 41. |
| <i>bicolor</i> Lwe. | G. galeata Paiva, iv, 41. |

Subgenus HISPIDELLA Lowe, 1852.

Hispidella LWE., Ann. Mag. N. H. (2), ix, Feb., 1852, p. 115, for *armitageana*, *revelata*, *sericea*; P. Z. S., 1854, p. 178, type *H. hispida* L.

Shell thin, fragile, brown, not chalky; perforate, convex-depressed; surface bearing flattened cuticular scale-like processes, simulating the hairs of *Trichia*. Whorls less than 5, the last angular, slightly deflexed in front. Aperture half-round, slightly lunate, the peristome slightly expanded, reflexed at columella, ends remote. Type *G. armitageana* Lwe.

Has a superficial resemblance to the Fruticicoloid Continental forms, but the sculpture is like that of Lowe's section *Irus*, and I am disposed to consider the group as a member of the present genus. Lowe was clearly in error in naming as the type of his group a species which he had not mentioned in his original publication of the name. *H. horripila*, a doubtful member of the group, is from the Azores.

- | | |
|--------------------------------|---------------------------------|
| G. armitageana Lwe., iii, 223. | G. horripila M. & D., iii, 222. |
|--------------------------------|---------------------------------|

Subgenus SPIORBULA Lowe, 1852.

Spiorbula LWE., Ann. Mag. N. H., Feb., 1862, p. 114 (proposed for *H. latens* and *obtecta*); P. Z. S., 1854, p. 175, type *H. oblecta*

Lwe.—*Irus* LWE., Ann. Mag., Feb., 1862, p. 114 (*laciniosa*, *squalida*, *depauperata*); P. Z. S., p. 174, type *H. depauperata* Lwe. Not *Irus* Oken, Naturgeschichte für Schulen, p. 647 (1821).

Shell perforated, globose-depressed, with conoidal or flattened spire, the whorls about 5, rounded, sutures deep; surface smoothish or coarsely wrinkled, sometimes bearing recurved cuticular scales. Aperture slightly oblique, round or oval, the parietal lip continuous and adnate. Type *G. oblecta*, pl. 68, fig. 13.

As the name *Irus* is preoccupied, its species may be merged in *Spirorbula*, which offers no very marked difference.

G. oblecta Lwe., iv, 35.

G. depauperata Lwe., iv, 36.

G. latens Lwe., iv, 35.

G. latinea Paiva, iv, 36.

G. squalida Lwe., iv, 35.

G. laciniosa Lwe., iv, 36.

Subgenus ACTINELLA Lowe, 1852.

Actinella LWE., Ann. Mag. N. H. (2), ix, Feb., 1852, p. 118, proposed for *stellaris lentiginosa*, *arcta*; P. Z. S., 1854, p. 180, type *H. lentiginosa* Lwe.—*Rimula* LOWE, t. c., p. 118, for *obserata* and *fausta*; P. Z. S., 1854, p. 181, not of DeFrance, 1827 (see Man. Conch. [I], xii, p. 269)+ *Callina* LWE., t. c., p. 183, sole species *H. rotula* Lwe.

Shell brownish or variegated, depressed-globose, the periphery subangular or keeled, umbilicus narrow or closed. Surface scaly, striate or rather sparsely granulated. Aperture oblique, peristome expanded and thickened within, its margins not much converging, parietal callus usually rather slight. Type *G. lentiginosa* Lwe., pl. 68, figs. 4, 5 (see also pl. 68, fig. 7, *G. [Callina] fausta*).

Distribution, mainly Madeira.

(Perforate or umbilicate, the callous of basal lip not toothed, *Actinella*.)

G. lentiginosa Lwe., iv, 38.

G. stellaris Lwe., iv, 38.

G. actinophora Lwe., iv, 40.

G. arcta Lwe., iv, 38.

v. *descendens* Woll.

G. arridens Lwe., iv, 40.

(Imperforate or nearly so, compact, granulate, basal callus strong and truncate, *Callina*.)

G. arcinella Lwe.,

G. obserata Lwe., iv, 40.

G. fausta Lwe., iv, 40.

v. *bipartita* Woll., iv, 40.

v. *robusta* Woll.

G. capsella Lwe., iv, 41.

G. rotula Lowe, iv, 46.

Subgenus CASEOLUS Lowe, 1852.

Caseolus LOWE, Ann. Mag. N. H. (2), ix, Feb., 1852, p. 115, for *sphaerula*, *compacta*, *abjecta*; P. Z. S., 1854, p. 184, type *H. compacta* Lwe.—+ *Hystericella* LWE., P. Z. S., 1854, p. 186, type *H. bicarinata* Sow.+ *Discula* LWE., t. c., p. 116; P. Z. S., 1854, p. 187, type *H. polymorpha* Lwe.+ *Tectula* LWE., t. c., p. 117; P. Z. S., 1854, p. 191, type *H. bulveriana* Lwe.—*Turricula* WOLL., Test. Atlant., p. 168, type *H. cheiranthicola* Lwe. (1878). Not *Turricula* (Klein) H. & A. Ad.= *Turris* Montf.

Shell perforate or umbilicate, varying from globose-depressed with rounded periphery, to subdiscoidal or to pyramidal, with keeled or double-keeled periphery. More or less granulated. Aperture rounded or oval, the lip blunt, usually a little expanded at columella. Type *G. compacta*, pl. 68, fig. 19 (see also *G. (Hystericella) bicarinata*, pl. 68, fig. 12; *G. (Discula) polymorpha*, pl. 68, figs. 8, 9.)

(Perforate; globose-depressed or globose-conic, *periphery rounded or bluntly angular*, *parietal lip adnate*; surface striate and granulate above, smooth or granose below; *color whitish*. CASEOLUS).

G. consors Lwe., iv, 39.
G. calculus Lwe., iv, 39.
G. compacta Lwe., iv, 39.
innominata Gray.

G. sphaerula Lwe., iv, 39.
subcallifera Lwe.
G. abjecta Lwe., iv, 39.
v. candidata Mke.
G. commixta.

(Perforate, *trochiform*, with *acutely keeled or double-keeled periphery*; *parietal lip raised and free*; surface *sharply granose throughout*; *color dusky*. HYSTRICELLA).

G. echinoderma Woll., iv, 34.
G. echinulata Lwe., iv, 33.
G. bicarinata Sowb., iv, 33.
duplicata Lwe.

G. vermetiformis Lwe.
G. turricula Lwe., iv, 33.
v. pererosa Woll.
G. leacockiana Woll., iv, 34.
G. oxytropis Lwe., iv, 33.

(*Umbilicate*, much banded and varied with brown; depressed, *subdiscoidal* or pyramidal, carinated; surface smoothish, inconspicuously granular. DISCULA).

- G. tetrica* Paiva., iv, 44.
G. polymorpha Lwe., iv, 44.
 elegantula Jan.
 saccharata Lwe.
 tæniata Rv.
 v. *salebrosa* Lwe., iv, 44.
 v. *poromphala* Lwe., iv, 44.
 v. *pittæ* Pva., iv, 44.
 v. *alleniana* Pva., iv, 45.
 v. *lincta* Lwe., iv, 45.
 v. *arenicola* Lwe., iv, 45.
 cinerea Lwe., iv, 45.
 v. *barbosæ* Pva., iv, 45.
 v. *pulvinata* Lwe., iv, 45.
 v. *papilio* Lwe., iv, 45.
 calcigena Lwe., iv, 45.
 v. *discina* Lwe., iv, 45.
 v. *gomesiana* Pva., iv, 45.
 v. *attrita* Lwe., iv, 46.
G. cheiranthicola Lwe., iv, 46.
 v. *mustelina* Lwe., iv, 46.
G. tabellata Lwe., iv, 46.
G. testudinalis Lwe., iv, 46.
 bulveriana var., Rv.
G. lyelliana Lwe., iv, 41.
G. albersi Lwe., iv, 42.
G. bulverii Wood, iv, 42.
 bulveriana Lwe.

(Umbilicate, lenticular, with a compressed and deflexed keel; base coarsely granose; texture chalky; white).

- G. tectiformis* Sowb., iv, 42. var. *ludovici* Alb., iv, 42.

Section *Disculella* Pils., 1894.

Ochthephila BECK, Index Moll., p. 17.—ALBERS-MARTENS, Die Hel., p. 118, type *H. maderensis*. Not *Ochthiphila* Fallén, 1823 (*Diptera*).—*Placentula* LOWE, Ann. Mag., Nat. Hist. (2), ix, p. 118, Feb., 1862; P. Z. S., 1854, p. 194, type *H. maderensis*. Not *Placentula* Lam., 1822.

Shell discoidal, umbilicate, with convex base and spire, the periphery keeled; solid, brown or whitish banded and maculated with brown. Surface striate above, smoother below. Whorls about 6, the last deflexed; aperture *circular*, oblique, the lip slightly expanded, narrowly white lipped within. Type *G. maderensis*, pl. 68, figs. 10, 11.

Distribution, Madeira Is. Distinguished from the very closely allied section *Discula* by the smoother, hardly granulate surface, and the rounder mouth.

- G. compar* Lwe., iv, 37. *G. leptosticta* Lwe., iv, 37.
G. tæniata W. & B., iv, 37. *G. micromphala* Lwe., iv, 37.
G. maderensis Wood, iv, 37. *G. dealbata* Lwe., iv, 38.
 cyclostoma Mke. *G. fictilis* Lwe., iv, 38.
G. spirorbis Lwe., iv, 41.

Subgenus HETEROSTOMA Hartman, 1844.

Heterostoma HARTMAN, Erd- und Süsswasser Gasteropoden der Schweiz, mit zugabe einiger merkwürdigen exotischen Arten, p. 177, type *H. semitecta* Hartm., pl. 62 (vii), f. 1-4, = *H. paupercula* Lwe.

Shell small, *planorboid*, umbilicated, angular or keeled at periphery, with 4 to 5 whorls, the last deflexed, *abruptly contracted at the aperture, the lip-edge thin and slightly expanded*, continuous; basal lip strongly arcuate, with *a heavy callous rib within, which ends in a tooth* within the outer lip; parietal wall elevated. Type *G. paupercula* Lowe, pl. 68, figs. 16, 17, 18.

The two species grouped here have been widely separated in former classifications.

G. paupercula Lwe., iv, 35.

semitecta Hartm.

tracheloides Mke.

G. coronata Desh., iv, 34.

juliformis Lwe.

Subgenus GEOMITRA Swainson, 1840.

Geomitra Sw., Malacology, pp. 166, 332, type *H. tiarella*.—*Coronaria* LOWE, Ann. Mag. (2), ix, p. 117 for *coronula* and *tiarella*; P. Z. S., 1854, p. 193, type *tiarella* (preoc.).—*Craspedaria* LOWE, t. c. p. 117, and P. Z. S., 1854, p. 192, type *H. delphinula*.

Shell depressed or conoidal, solid, dull brown, rudely sculptured; *whorls of the spire plicate below the sutures*, more or less keeled at periphery; base cylindrical, umbilicated, *sculptured with granose spiral cords*. Aperture nearly round, very oblique, the *peristome expanded, thin, continuous*, solute, the parietal callus raised from the preceding whorl. Type *G. tiarella* Webb & Berthelot, pl. 68, fig. 6. (See also pl. 68, figs. 1-3, *G. delphinula*).

Jaw (of *tiarella*) low, slightly arcuate, the anterior surface with about 15 flat, broad, crowded ribs, scarcely denticulating the cutting margin. (*Binney*).

Radula with 12. 9. 1. 9. 12 teeth of same character as figured for *Plebecula lurida*.

Distribution, Madeira. This group is extremely peculiar in the coarse spiral sculpture of the base, and the coronated whorls of the spire.

Swainson in his first reference to this group figures the *H. tiarella*, but does not mention it by name. In his later reference he confuses *tiarella* with the figure and description of *H. bicarinata* Sow., but his diagnosis shows clearly the species intended.

<i>G. tiarella</i> W. & B., iv, 35.	<i>G. grabhami</i> Woll.
<i>G. moniziana</i> Paiva., iv, 34.	<i>G. delphinuloides</i> Lwe., iv, 34.
<i>G. coronula</i> Lwe., iv, 34.	<i>G. delphinula</i> Lwe., iv, 44.

Genus HELICELLA Férussac, 1819.

Helicella FER., Tableau Syst. de la Fam. des Limaçons, p. 37 (fourth group only).—Risso, Hist. Nat. Eur. Mérid. p. 67, 1826, in part.

=*Xerophila* Held, 1837 and of subsequent authors, with *Helicopsis* Fitz, 1833, *Zenobia* and *Jacosta* Gray, 1821, etc., etc.

Shell umbilicate or perforate, with either cylindrical or keeled whorls; opaque and earthy, white or whitish and usually banded, not hairy; aperture round-lunate or angular, not very oblique, the lip acute, hardly expanded, thickened within (See pl. 68, figs. 20 to 30.)

Jaw with 4–11 wide, flattened ribs (pl. 67, figs. 12, 14).

Radula (pl. 67, fig. 13 *H. caruana* v. *gattoi*) with teeth of the type usual in ground-snails. Median teeth with weak ectocones or none, laterals with small divergent ectocones. On the marginals the inner cusp is either simple or bifid, outer cusp single or split (see also pl. 67, fig. 16, *H. terrestris*).

Genital system (pl. 69, all figs.) having the penis rather short, continued in an epiphallus bearing retractor, and ending in a short flagellum. Dart sack single or paired, with or without accessory sacks, and containing curved darts which are two-bladed at least toward the point. Mucus glands simple and tubular, several in number or numerous, but inserted individually on vagina. Spermatheca oval or irregular, borne on a rather short, unbranched duct. *Right eye-retractor passing to the left of genital system, not between its branches.*

An exception to the above diagnosis occurs in *Theba*, where the penis lacks retractor-muscle, and the dart sack is empty (pl. 69, figs. 14, 16, 22). In many species a sack-like organ or appendix, of unknown function is developed on the penis or on the atrium; and in

certain forms a spermatophore of unusual size is found, having the rod-like form and chitinous texture noticed in *Leptaxis*, but with serrate edge.

Helicella is allied to *Hygromia* in the simple-lipped shell, simple form of dart and frequent duplication of the dart sack. It differs from *Hygromia* in having the right eye-retractor pass to the left of the genital system instead of between its branches, and in the solid, earthy white shell. Outside of these two European groups the double dart sack occurs only in the Mexican genus *Lysinoe*. The peculiar disposition of the right eye retractor muscle occurs again in *Leucochroa*.

The species are very numerous throughout the Mediterranean countries, and many of them show a considerable range of individual variation, and also local or geographic racial forms; but the number of true species or subspecies is not over one-fourth the number of nominal species, mostly described by authors of the so-called Nouvelle Ecole of France. No individual variation is too slight to be called a "species" by some of these writers; and a large list could readily be given of "species" founded merely on *young shells* of well-known forms. Unfortunately for science, many of these worthless names, even some demonstrated to be the young of other species, have been adopted into works supposed to be authoritative, such as Westerlund's "Fauna." The result is that in Europe, where from the number of workers one would expect that the fauna would be well worked up and understood, the study of *Helices* is in a semichaotic condition so far as species work is concerned, and infinitely behind the condition of the science in America, the West Indies or Australia.

The tertiary deposits of Europe have afforded but few members of this genus; and although recorded from lower Miocene deposits, there are few if any undoubted representatives earlier than Pleistocene. This seems to indicate that the group is comparatively new to middle European soil.

The present group has usually been called *Xerophila* by recent authors; but several terms proposed by Risso and Gray precede Held's publication, besides the still earlier Férussacian name *Helicella*. Even were we to reject Férussac's term, the next name in order would be *Jacosta* Gray, 1821, founded on *H. explanata*. In no case can one use *Xerophila* as a generic name without throwing the rule of priority to the winds. There are, however,

plenty of writers quite willing to do this. *Xerophila* has been used in Ornithology (P. Z. S. 1840, p. 175) but later in date than Held's publication.

The division of the genus into sections is difficult on account of the large number of species intermediate in form; and the data at hand are insufficient for their discrimination on anatomical grounds. It is further complicated by the number of names proposed for members of the group, and their intricate synonymy. Although perhaps fairly able to distinguish small systematic groups, the writer claims to be no expert in perceiving the subtle distinctions made by some authors in this genus. Those who find a greater number of sections useful should avoid two radical faults in the present European usage: *i. e.* the use of preoccupied names and the use of old names for groups containing *none* of the species on which such sectional terms were originally based. Monterosato has recently proposed an entire new set of no less than forty-one sectional names, which for uniformity all begin with *Xero-*. There is much dry humor in this proposition, for he ignores all previous sectional nomenclature except *Xeroleuca*, and the new terms are mostly Greek X Latin hybrids, hideous in etymology and senseless in meaning.

Subgenus HELICELLA, penis retractor muscle present and well developed.	{	Xerocrassa Monts.	Jacosta Gray.
		Heliomanes Moq.	Xeroleuca Kob.
		Helicella <i>s. str.</i>	Obelus Hartm.
		Xerocampylaea Kob.	Trochula Schlüter.
		Candidula Kob.	Cochlicella Risso.
	{	Monilearia Mouss.	

Subgenus THEBA, no penis-retractor muscle. Muscus glands present. No dart in the empty sack.	{	Theba Risso.
		Lejeania Ancey.
		Platytheba Pils.

Section *Xerocrassa* Monterosato, 1892.

Xerocrassa MONTs., Moll. Terr. Is. adiacenti Sicil., p. 23, type *H. seetzeni*.

Shell narrowly umbilicated, thick solid and chalky, varying from discoidal to turbinate. Type *H. seetzeni*.

A desert form of *Heliomanes* characteristic of Palestine and Arabia, perhaps worth a sectional name.

H. seetzeni Koch, iii, 223.

· *sabæa* Boiss.

f. fasciata Mouss.

f. subinflata Mouss.

f. avia West.

H. beadlei Pils., viii, 176.

H. eremophila Boiss., iii, 242.

· *cremophila* Boiss. err. typ.

v. *amuniensis* Mts.

H. erkellii Kob., iii, 243.

v. *discrepans* Pils., viii, 177.

H. sinaica Mart., viii, 178.

H. psammita (B.) West.

Section *Heliomanes* Moquin-Tandon, 1855.

Heliomanes (Fér., Tabl. Syst., not used in a generic or subgeneric sense) MOQ.-TAND., Hist. Nat. Moll. Fr., p. 259, and of subsequent authors.—*Xeroampulla* MONTs., Moll. Terr. Is. Adi. Sicil. 1892, p. 22 (for *aradasii*, *subprofuga*, *pellucens*, *enhalia*).—*Xerofusca* MONTs. *l. c.* (for *luctuosa*, *benoiti*, etc.).—*Xerolauta* MONTs., *t. c.*, p. 23 (for *virgata*, *variabilis*, *lauta*).—*Xerolincta* MONTs., *l. c.* (for *arenarum*, *astata*, *euetha*).—*Xerolæta* MONTs., *l. c.* (for *ægusæ*, *tuta*, *edulis*, *variata*, *rufolabris*).—*Xerovaria* MONTs., *l. c.* (for *tergestina*, *stroniana*, *lineata*).—*Xerambigua* MONTs., *t. c.*, p. 24 (for *dantei*).—*Xerolutea* MONTs., *l. c.* (for *luteata*, *luteola*, *dautezi*, *melania*).—*Xeromagna* MONTs., *l. c.* (for *cespitum*, *introducata*, *marioniana*).—*Xeropicta* MONTs., *l. c.* (for *krynickyi*).—*Xerobulla* MONTs., *l. c.* (for *bollenensis*, *robiniana*, *perroudiana*).—*Xeromunda* MONTs., *t. c.*, p. 25 (for *turbinata*, *candiota*).—*Xerocauta* MONTs., *l. c.* (for *cretica*, *cauta*).—*Xerovera* MONTs., *l. c.* (for *subrostrata*, *lacertarum*, *mauritanica*, *oranensis*, *cyclostoma*, *sphærita*, *caruanæ*, *galloi*, *metabola*, *rusticana*, *fraudulenta*).—*Xerolissa* MONTs., *l. c.* (for *acompsia*, *acompsiella*).

Shell with moderate or small umbilicus, conoidal or low conoidal spire and rather tubular, unkeeled whorls. Surface nearly smooth; solid and chalky, whitish and often banded or striped. Aperture rounded-lunar, lip acute, labiate. Type *H. variabilis* Drap., pl. 68, fig. 20.

Genital system (pl. 69, figs. 1, 2 *H. variabilis*): Dart sack containing a slightly curved dart (fig. 1), and with an accessory sack; mucus glands with numerous tubes. In some forms two dart sacks are developed (see also pl. 69, figs. 3, 4, 5, *H. virgata*).

This group contains the largest species of the genus. The whorls are less tubular than in *Helicella s. str.* and the spire generally higher, umbilicus smaller. Some species have one, others two functional dart sacks. The distribution is the same as that of *Candidula*—middle Europe north to England, and south to northern Africa.

Species numerous, but multiplied to an almost inconceivable number by the "new school" conchologists.

- H. sitifiensis* Bgt., viii, 165.
H. sphærita Hartm., iii, 249.
H. stiparum Rm., iii, 241.
H. submaritima Desm.
 lauta Lwe., iii, 235.
H. subrostrata Fér., iii, 231.
H. terveri Mich., iii, 240.
 arenivaga Mab.
 luci Flor.
 adolæ Flor.
H. turbinata Jan., iii, 234.
 cyclostomoides Porro.
 pilula Mouss.
H. ungeri Zel.
H. variabilis Dr., iii, 230.
 striata Brard.
 zonaria Don.
 subalbida Poir.
 burdigalensis Grat.
 lunaretina Bgt.
 jussiana Bgt.
 grannonensis Bgt.
 salentina Bl.
 mendranoi Serv.
 v. *turbinata* Cafici.
 variata West.
H. variegata Friv., iii, 235.
 v. *pustulosa* Parr.
H. vestalis Parr., iii, 240.
 ? *mesopotamica* Mouss.
 v. *foveolata* West.
H. virgata DaC.
H. zaccarensis Kob., viii, 168.
H. krynickii Andr., iii, 247.
 babondubii Parr.
 theodosæ Cl.
 radiolata Mss., iii, 240.
 v. *candaharica* Pfr., iii, 247.
H. lampedusæ Kob., viii, 175.
H. laurinae Iss., viii, 166.
H. luteata Parr., iii, 231.
 f. subluteata Serv.
 f. matronoi Serv.
H. maritima Dr., iii, 235.
 lineata Oliv. not Say.
 pseudenhalia Bgt.
 canariensis Sh.
H. mauritanica Bgt., iii, 235.
H. millepunctata Btg., viii, 178.
H. modica Mouss., iii, 236.
H. moesta Parr., iii, 233.
 v. *luctuosa* Caf.
H. moneriana Bgt., viii, 165.
H. oranensis Morl., iii, 249.
H. parva Parr., iii, 232.
H. pellucens Sh., iii, 232.
H. piratarum Kob., iii, 240.
H. richardi Kob., viii, 174.
H. sebkarum Deb., viii, 167.
H. semenowi Mart., iii, 237.
H. simulata Fér., iii, 232.
 ? *striatula* Bk.
H. derbentina Andr., iii, 247.
 v. *caucasica* Parr.
 v. *depressa* Ret.
 v. *isomera* Friv.
 v. *armeniaca* Bay.
 v. *suprazona* Mss.
 v. *suberrans* Mss.
 v. *constricta* West.
H. devauxi Deb., iii, 240.
H. didyma West.
 thiesseæ Mouss., iii, 24.
H. djebbarica Bgt., iii, 236.
H. dragorichi Zel., iii, 249.
H. durieuri Moq., iii, 236.

- H. erithrocheila* Sul., viii, 189.
rufolabris Ben. not Jeffr., iii, [233].
H. euphorca Bgt., iii, 230.
H. euxina Cl., iii, 231.
H. fabriesi Deb., viii, 168.
H. globuloidea Terv., iii, 243.
arenarum Bgt.
H. gouini Deb., viii, 170.
H. hamilcaris Kob., iii, 233.
H. herbicola Sh.
H. hydruntina Bl., iii, 230.
H. joppensis Roth, iii, 244.
bargesiana Bgt., iv, 7.
f. subkrynickyana Mouss.
f. multinotata Mouss.
? mesopotamica Mss.
H. caruanæ Kob., viii, 174.
v. gattoi Kob., viii, 175.
H. cauta West., iii, 240.
H. cespitoides Fisch., viii, 176.
H. cespitum Drap., iii, 241.
carnina Cheir.
eurythmia Hartm.
v. dismathia Nev.
v. alticola Nev.
v. introducta Zgl., iii, 242.
H. chalcidica Bl., iii, 24, 231.
H. choreta Bgt., iii, 231.
H. cistorum Mor., iii, 236.
H. colomesiana Bgt., iii, 232.
H. commeata Mouss.
H. cottyi Mor., iii, 236.
H. cretica Fér., iii, 239.
v. littoralis Mouss.
v. akrotirensis Kob.
H. critica Fér.
H. cyrenaica Mts., iii, 234.
H. danieli Bgt., iii, 230.
H. dautezi Kob., iii, 248.
H. davidiana Bgt., iii, 24.
H. accompisia Bgt., iii, 231.
v. accompisiella Anc.
H. adolphi Pfr., iii, 241.
H. ægusæ Kob.
H. affinior Deb., viii, 166.
H. agreabilis Zgl., iii, 234.
H. amoma Bgt.
H. aradasii Piraj., iii, 223.
filograna Villa.
H. arcuata Zgl., iii, 234.
H. arigonis Rm., iii, 241.
arigoï Bgt.
H. armoricana Bgt., iii, 242.
H. benoiti Caf., iii, 233.
H. berlieri Morl., iii, 236.
? lacertarum Bgt.
H. bollenensis Loc., viii, 170.
lauracina Fag.
H. breveti Deb., viii, 169.
H. calida Kob., viii, 167.
H. calopsis Bgt., viii, 165.
H. camerata Mouss., iii, 232.
H. candiota Friv., iii, 234.
H. canina Anc., viii, 177.

Unfigured, insufficiently known species:—*H. mayeti*, *valeryana*, *eumona*, *pachesta*, *charmesiana*, *bilottiana*, *blossura*, *elithia*, *arbana*, *ionstoma*, *ianthinostoma*, *amethysta* Let. & Bgt.; *bousqueti* (Deb.) W.; *casertana* B.; *tacapica*, *tabarkana*, *una*, *tebourbana* Let. & Bgt.; *therella* (Berth) B.; *thera* Let. & Bgt.; *foedata* (Hagenm.) B.; *tæniata* W.; *dexia*, *neftana* B.; *libertina* (Let.) W.; *pompei-ana* B.; *desilvæ* Serv.; *ogiaca* Serv.; *microspila* B.; *euxina* Cl.;

salentina (Bl.); privata Galland; zerguana (Hagenm.); philoxera Caf.; euetha (B.); limara B.; erythræa W.; halophila (Deb.); xera (Hagenm.); mahdarina B.; didiera (B.); nya, latastei Let.; latasteopsis, fratisiana, tafermica, mezessaria Let. & Bgt.; æstuosa Berth.; inversa, æqua W.; zemonicensis Stoss.; naudieri B.; eusarca Anc.; eusarcomæa Anc.; oconella Let. & Bgt.; steriolena, adisana Bourguignat; psammathæa Let. & Bgt.; bertina B.; etæma Let. & Bgt.; menzelensis Letourneaux & Bgt.; ram-lensis B.; comandadori Serv.; panurga B.; euphorcella Pech.; euphorcopsis, esnorca Let.; meticulosa Let. & Bgt.; carpensoractensis Fag.; robiniana B.; foliorum Fag.; prinohila Mab.; perroudiana Loc.; visanica Fag.; taria B.; vettonica Serv.; maxulana Let. & Bgt.; entara, zitanica Let. & Bgt.; rhodochila W.; lotophagorum, meninxica, mesembrica Let. & Bgt.; mantinica Mab.; locardi W.; panescorsi Bérèng.; dantei, calopsis B.; eucestella, eucesta B.; ammederana, haidrana, birta Let. & Bgt.; dolomitica Deb.; rachgonica B.; kabyliana Deb.; euthymæana Loc.; actia B.; actiella, nautica, suberis Loc.; evenosi B.; maristorum Flor.; cyclostoma W.; axiotheata B.; lemoinei Deb.; ferianica Let. & Bgt.; oreta B.; pedianopsis Hagenm.; certa B.; caudefacta Let. & Bgt.; leucophora, ingenua, acela, monerea, chioidea B.; phoebeia Let. & Bgt.; spilmenti, catarota, cana, leucestha B.; hadrumetorum Let. & Bgt.; urbarana Pech.; eucana Hagenm.; barrattei, slouguia, khaugentina, artara, burella, boudriesa Let. & Bgt.; armoricana, anephela, pediana B.; ripacureica Bofill; ilicis Florence; megastoma B.; celestis Let. & Bgt.; meteora B.; suspecta W.; talepora, acosmeta B.; lersiana Fag.; calographa W.

Section *Helicella* s. str.

Helicella Fér. t. c. (in part).—Risso, t. c., p. 67, in part, and of authors.—*Planatella* CLESSIN, Deutsche Exc. Moll. Fauna, 1876, p. 143 (for *ericetorum* and *candicans*), Mollusken fauna Oesterreich-Ungarns und der Schweiz, 1887, p. 180.—*Xerolaxa* MONTEROSATO, Moll. Terr. delle Isole adiacenti Sicilia, p. 24, from Atti della R. Accad. di Scienze, Lettere e Belle Arti, (3), ii, 1892, (for *ericetorum*, pamplonensis).—*Xerofriga* MONTS. l. c. (for nubigena).—*Xerogyra*. MONTS., l. c. (for spadæ, bathyomphala).—*Xerocincta* MONTS., l. c. (for neglecta).—*Xerolenta* MONTS., l. c. (for obvia, derbentina).—*Pseudoxerophila* WESTERL. Aperçu Faun. Mal. Grèce, 1879, p. 55 (for bathytera, etc.).

Shell much depressed and broadly umbilicated, with smoothish, tubular whorls, rounded at periphery, and of the usual chalky texture and white, banded coloring. Aperture small, round or oval; but little modified by the preceding whorl, the lip slightly expanded Type *H. ericetorum* Müll., pl. 68, figs. 21, 22.

Jaw arched, strongly ribbed. Genital system (pl. 69, figs. 6, 7, 8, *H. ericetorum*) with short swollen penis, long epiphallus upon which the retractor is inserted, and very short flagellum. High on vagina are two symmetrically placed dart sacks (fig. 7), containing well curved round darts, provided toward the end with two narrow blades (fig. 8). Mucus glands numerous.

H. aberrans Mouss., iii, 246.

H. ammonis Schm., iii, 245.

f. candida Porro.

v. sclerostoma Stef.

v. bononiensis Stef.

v. bonaldi Ad.

H. apollinis Mts.

H. bathytera Bl. & W.

f. affinis Bl.

H. bathyteropsis Serv.

H. enhalia Bgt., iii, 243.

H. ericetella Jouss., iii, 243.

H. ericetorum Müll., iii, 245.

trochlearis Andr.

küsteri Held.

? itala L. *media* Gm.

dubia Hartm.

f. devians West.

erica DaC.

obliterata Hartm.

f. tardyi Bgt.

H. gyroides Parr., iii, 246.

H. instabilis Zieg., iii, 248.

neopolitana Andr.

spadae Calc.

nubila Charp.

ocellus Villa.

v. nubigena Charp. vi, 84.

v. bathyomphala Charp.

v. destituta Charp.

v. discrepans Tib.

v. graeca Mart.

? iphigeniae Deb.

H. interpres West., iii, 242.

H. lemoinei Deb., iii, 246.

H. neglecta Drap., iii, 243.

clivorum Hartm.

varians Risso.

H. obvia Mke.

candicans Auct., iii, 244.

v. arenosa Z., Rm.

v. dejecta Z., Rm., iii, 246.

v. renoufi Serv.

v. pullula Parr.

v. dobrudschæ Parr.

v. graeca Mts.

H. pamplonensis Schm., iii, 246.

H. spirula Zel., iii, 249.

v. bakowskyana Cl., iii, 248.

H. talmacensis Blz.

H. vukotinoviei Hire., iii, 246.

liburnica Stoss.

H. vulgarissima Mouss., iii, 245.

Insufficiently known or unfigured species:—*H. virgultorum* Bgt., *morbihana* Bgt., *fagoti* West., *dysmnica* West., *synerosa* Serv., *sal-*

aunica Fag., maladettæ (B.) Fag., sabulivaga and marsillyana Mab., nephæca Fag., homoleuca Parr., tauchoniana Bgt., tenuisculpta West.

Section *Xerocampylæa* Kobelt, 1871.

Xerocampylæa KOB., Catalog, p. 15, footnote, for *H. zelebori*.

Shell depressed with horn-colored apex and wide last whorl with rounded periphery; rather thin and white with 2 bands (or none). umbilicus funnel-shaped but very small. Aperture transverse oval, the lip dilated at columellar insertion partly covering umbilicus. Type *H. zelebori* Pfr., pl. 43, figs. 29, 30.

Genital system as in *Helicella*, two dart sacks being developed. Distribution, Bosnia, Servia. Formerly referred to *Campylæa*, but now admitted to belong to the *Xerophila* group.

H. zelebori Pfr., iv, 83.

The following forms or varieties of *Zelebori* are distinguished by French new school authors: *bortana*, *adarella*, *carosina*, *ottoi*, *twarkoi*, *nactara* and *acaria* Servain.

Section *Candidula* Kobelt, 1871.

Helicopsis FITZ., Syst. Verzeich Weichthiere, etc., 1833, p. 101. *H. striata* the sole species. Not *Helicopsis* Fab., 1808 (*Lepidoptera*), --*Striatella* WESTERLUND, Fauna Eur. 1876, not of Brot (*Melaniide*).—*Candidula* KOBELT, Catalog., 1871, p. 22.—*Xerolena* MONTS., Moll. Terr. Isole adiacenti Sicil. 1892, p. 22 (for *H. virginialis*, *hamilcaris*, *ingoï*).—*Xerotringa* MONTS., l. c. (for *H. tringa*, *phari*, *parentina*, *meridionalis*, *substriata*), =group *Cisalpinana* Fagot.—*Xerovaga* MONTS., l. c. (for *H. caperata*, *heripensis*, *gigaxii*, *andalusica*).—*Xeroalbina* MONTS., t. c., p. 23 (for *candidula*, *unifasciata*, *gratiosa*, *striata*).—*Xeromicra* MONTS., l. c. (for *H. apicina*).—*Xerotricha* MONTS., l. c. (for *H. conspurcata*).—*Xeroclausula* MONTS., t. c., p. 22 (for *meda*).—*Striatella* CLESSIN, Deutsche Exc. Moll. Fauna, p. 149 1876, (for *H. candidula*, *H. striata*).

Shell rather small, depressed, narrowly umbilicated, solid and chalky; the surface striated; apex corneous or dark; whorls about $4\frac{1}{2}$, the last rather wide and rounded. Aperture round-lunate, lip simple, strengthened by a submarginal rib within. Type *H. candidula*, pl. 68, fig. 28.

Genital system (pl. 69, fig. 10, *H. candidula*). Dart sack single and simple; mucus glands consisting of four tubes. Appendix wanting. Flagellum very short. See also pl. 69, fig. 9, *H. caperata*. In some species (pl. 69, fig. 13, *H. striata*) there are two dart sacks with two accessory sacks, and about 11 mucus glands.

Distribution, Middle Europe and circum-Mediterranean region.

It is probable that two sections will be distinguished in this group, the division to be based on the number of dart sacks; but at present so few species have been dissected that such division is not possible,

- | | |
|---------------------------------------|--|
| <i>H. acutistria</i> Bttg., iv, 10. | <i>solitaria</i> Poir. |
| <i>H. agrioica</i> Bgt., iv, 9. | v. <i>alpicola</i> Stab., iv, 10. |
| <i>H. andalusica</i> Kob., viii, 160. | v. <i>thymorum</i> v. Alt. iv, 10. |
| <i>H. apicina</i> Lam., iv, 5. | v. <i>gratiosa</i> Zgl., iv, 10. |
| <i>cenisia</i> Charp. | <i>strigatula</i> Hartm. |
| <i>hispidula</i> Risso. | <i>adnumerata</i> Parr. |
| <i>cupani</i> Calc. | v. <i>spirilla</i> West. |
| v. <i>ramburi</i> Mab., iv, 6. | v. <i>vortex</i> West. |
| v. <i>requieni</i> Moq. | v. <i>albicinctella</i> Colb. |
| v. <i>mühlfeldtiana</i> Zgl. | v. <i>namurcensis</i> Colb. |
| v. <i>citharistensis</i> Bgt. | v. <i>lunulata</i> Kryn. |
| v. <i>psaropsis</i> Loc. | v. <i>mellæ</i> Pini. |
| v. <i>marsiana</i> Bgt. | v. <i>iriana</i> Poll. |
| <i>H. armillata</i> Lowe, iv, 15. | v. <i>vinçæ</i> Paul. |
| <i>lowei</i> P. & M. | <i>H. cantabrica</i> Hid. |
| <i>eumæus</i> Lwe. | <i>H. caperata</i> Mont., iv, 14. |
| <i>H. arrouxi</i> Bgt., iv, 12. | v. <i>lauta</i> Lwe. |
| <i>H. bardoensis</i> Bgt., iv, 7. | v. <i>barcinensis</i> Bgt., iv, 14. |
| <i>H. braidensis</i> Poll. | <i>mirandæ</i> Ramb. |
| <i>H. calymnia</i> Mts., viii, 179. | <i>iberica</i> Ramb. |
| <i>H. camerata</i> Mouss. | v. <i>diniensis</i> Ramb. |
| <i>H. candidula</i> Stud., iv, 10. | <i>H. carascalensis</i> Fér., vi, 103. |
| <i>unifasciata</i> Poir. | <i>H. cisalpina</i> Jan. |
| <i>bidentata</i> Dkr. | <i>H. cistorum</i> Morel. |
| <i>graphica</i> Hartm. | <i>H. codia</i> Bgt., iv, 16. |
| <i>rugellosa</i> Hartm. | <i>H. conspurcata</i> Drap., iv, 12. |
| <i>striatula</i> Hartm. | <i>radiolata</i> Jan. |
| <i>azona</i> Andr. | <i>ætnæa</i> Ben. |
| <i>unizona</i> Andr. | v. <i>illuviosa</i> Nev. |
| <i>radiolata</i> Andr. | v. <i>psara</i> Bgt. |
| <i>elegans</i> Flem. | <i>H. cyparissias</i> Parr., iv, 11. |

- H. derogota Rm., iv, 23.
 v. angulata Rm., iv, 23.
 murcica Guir.
 H. diensis Malz., viii, 162.
 H. dohrni Paul., viii, 173.
 H. etrusca Iss.
 H. estricta Bgt., iv, 13.
 H. fedtschenkoi Mart., iii, 24,
 [iv, 9.
 H. geryvillensis Bgt., iv, 6.
 H. gigaxii Charp., iv, 16.
 H. guimeti Bgt.
 H. hellenica Bl. & W., viii, 163.
 v. contempta Parr.
 H. heripensis Mab., viii, 158.
 ruida (B.) Cout.
 pouzonensis Fag.
 v. solaciaca Mab., viii, 159.
 H. heynemanni Kob., viii, 169.
 H. illibata Parr., iii, 249.
 H. improbata Mouss., iv, 12.
 H. intersecta Mich., iv, 13.
 ignota Mab.
 H. jaylei Pal., viii, 164.
 v. rusticula Pal., iv, 14.
 H. kotschy Pfr.
 H. lallemantiana Bgt., iv, 6.
 H. langloisiana Bgt., iv, 15.
 H. letourneuxiana B., iv, 12.
 H. locheana Bgt., iv, 13.
 H. loroglossica Mab., viii, 159.
 H. madritensis Ramb., iv, 16.
 H. meda Porro, iv, 17.
 subclausa Rm.
 turatii Parr.
 calypso Parr.
 H. meridionalis Parr., iv, 9.
 H. mesostena West., viii, 175.
 H. metabola West.
 H. modica Morel.
 v. attafsensis Morel.
 H. molinæ Hid., iv, 15.
 H. moricola Pal., iv, 13.
 H. obruta Morel., iv, 6.
 H. tuta Paul., viii, 173.
 H. vatonniana Bgt., iv, 31.
 florentia Pons., viii, 161.
 H. velascoi Hid., vi, 103.
 H. ordunensis Kob., viii, 161.
 H. paladilhi Bgt., iv, 11.
 H. parableta Bttg., iv, 8.
 H. penchinati Bgt., iv, 16.
 H. perroudiana Loc., iv, 8.
 H. profuga Schm., iv, 7.
 phari Fagot, iii, 241.
 fasciolata Moq.
 fimbriata Chier.
 apennina Chier.
 v. attica Bttg.
 v. variegata Mouss.
 v. comnena Ret.
 H. protea Ziegl., iv, 5.
 campestris Zgl.
 pustulata Mühl.
 H. psiloritana Malz., viii, 162.
 H. quisquiliæ Paul., viii, 164.
 H. reboudiana Bgt., iv, 6.
 H. rokniaca Bgt., iii, 198.
 H. rugosiuscula Mich., iv, 11.
 H. sardiniensis Villa, viii, 164.
 H. schaufussi Kob.
 H. semipicta Hid., iv, 16.
 H. striata Müll., iv, 7.
 costulosa Zgl.
 narbonensis Req.
 v. nilssoniana Bk.
 v. füredensis Serv.
 v. bakonyca Serv.
 v. plattenica Serv.
 H. subapicina Mouss., iv, 6.
 v. istera Let. & Bgt.
 H. subcostulata Bgt., iv, 9.

- H. submeridionalis* B., iv, 14. *H. tricastinorum* Flor., iv, 9.
H. subprofuga Stab. *H. tuta* Paul., viii, 173.
H. substriata Cl., iv, 9. *H. vatoniensis* Bgt., iv, 31.
H. subvariegata Malz., viii, 163. *florentina* Pons., viii, 161.
H. trepidula Serv., viii, 171. *H. velascoi* Hid., vi, 103.

Insufficiently known forms:—*H. deana* and *H. pleurestha* (Tassy) Berth., *H. mediolanensis* Fag., *H. grandiscanensis* Fag., *H. aprutiana* Fag., *H. florentina* Fag., *H. brundusiana* Fag. *H. muggianica* Stoss., *H. tringa* Fag., *H. ingoi* Cafic., *H. lesiniaca* Fag., *H. parthenia* Hag., *H. rhytiphora* Chemn., *H. herbatica* Fag., *H. kryzensis* Bgt., *H. solanoi* Serv., *H. ægila* Loc., *H. xalonica* Serv., *H. alluvionum* Serv., *H. odarsensis* Fag., *H. montgiscardiana* Fag., *H. grannonensis* Bgt., *H. canovasiana* Serv., *H. mendranoi* Serv., *H. blasi* Serv., *H. agna* Hag., *H. cyzicensis* Gall., *H. ariantina* West., *H. tremata* Let. & Bgt., *H. tritonidis* Jon., *H. fera* Bgt., *H. nova* Bgt., *H. subneglecta* Bgt., *H. phthiota* West., *H. pastorella* West., *H. curetum* West., *H. agreabilis* Zgl., *H. arcuata* Zgl., *H. samnitum* and *v. pugnax* W., *H. mehediana* L. & B., *H. ycaunica* Mab., *H. philomiphila* Mab., *H. vicianica* Bgt., *H. caturigia* Paul., *H. arceuthophila* Mab., *H. bardoensis* Bgt., *H. lecouffei* L. & B., *H. duveyrieriana* Bgt., *H. herbarum* Serv., *H. oberthuri* Anc., *H. incolumis* Bgt., *H. codia* Bgt., *H. subintersecta* Bgt., *H. strucki* Mz., *H. pictonum* Bgt., *H. olisippensis* Serv., *H. badigerensis* Fag., *H. monistrolensis* Fag., *H. idiophya* Flor., *H. callestha* Béreng., *H. tolosana* Bgt., *H. groboni* Bgt. and *v. xenilica* Serv., *H. lieuranensis* Bgt., *H. margieriana* Fag., *H. pauli* Bgt., *H. valcourtiana* Bgt. and *v. veranyi* Bgt., *H. crouzilliana* Fag., *H. gesocribatensis* Bgt., *H. philora* Bgt., *H. thuillieri* Mab. with *v. nomephila* Bgt., *H. coutagnei* Bgt. with vars. *acentromphala* and *mauriana* Bgt., *H. lemesli* Mab., *H. scrupaea* Bgt., *H. siticulosa* Fag., *H. diniensis* Ramb., *H. idanica* Loc., *H. caluzaci* Bgt., *H. velaviana* Bgt., *H. triphera* Bgt., *H. jeanbernati* Bgt., *H. belloquadrica* Mab., *H. mouqueroni* Bgt., *H. leiolemma* West., *H. acosmia* Bgt., *H. microphana* Bgt., *H. ilicetorum* Mab., *H. garoceliana* Loc., *H. tarasconensis* B., *H. simiarum* Kob., *H. alavana* Bgt., *H. mascarenasi* B., *H. culmi* Fag., *H. segetum* Fag., *H. lunulata* Kryn., *H. elimberrisiana* Loc., *H. aurigerana* Fag., *H. lugduniaca* Mab., with *f. stictica* W., *H. ussatensis* B., *H. arelatensis* Loc., *H. lusoi* Serv., *H. saldubensis* Serv., *H. pinii* West., *H. arganica* Serv., *H. belemensis* Serv., *H. taconera* Serv., *H. mercedesi* Serv., *H. ramhuri* Mab., *H. carcusiaca* Mab., *H. hypæana* B., *H. danieli* B., *H. deferiana* B., *H. lathræa* B., *H. melania* B., *H. halia* B., *H. salivosa* B., *H. barcinonensis* Fag., *H. madritensis*

Ramb., *H. pallaresica* Fag., *H. salvanæ* Fag., *H. elniæ* Fag., *H. moreri* Fag., *H. subiberica* Fag., *H. crisia* Let. & Bgt., *H. zaragozensis* Serv., *H. campoensis* Fag., *H. tarifensis* B., *H. specialis* B., *H. djebbarica* B., *H. warnieriana* B., *H. irrita* Berth., *H. debeauxi* West., *H. micromphalus* Let., *H. lirouxiana* B., *H. madida* Fag., *H. misara* B., *H. paladilhiformis* Fag., *H. romulina* Serv., *H. noctuella* B., *H. arnusi* Serv., *H. edetanorum* Serv., *H. ambieliana* (Ch.) Pal., *H. bradybæna* L. & B., *H. terricola* B., *H. galeomma* B., *H. æglia* L. & B., *H. argoderma* B., *H. briaræa* B., *H. aggarica* B., *H. eucorea* B., *H. amicula* B., *H. amphibola* B., *H. ambloxa* L. & B., *H. anasia* B., *H. goniogyra* B., *H. concholeuca* L. & B., *H. vivida* Hagenm., *H. hipponensis* Mor., *H. isæa* Hagenm., *H. irana* Hagenm., *H. castroiana* Serv., *H. ademata* B., *H. avenionensis* B., *H. tassiana* Fag., *H. diloricata* B., *H. vafella* L. & B., *H. propria* Gall., *H. augustiana* B., *H. pisanorum* B., *H. luteola* Serv., *H. eucalia* Hagenm., *H. hispalina* Serv., *H. frayssina* B., *H. crema* B., *H. hola* B., *H. hierocontina* W., *H. hierapetrana* Mz., *H. colosseana* Fag., *H. romana* Fag., *H. fiesolensis* Fag., *H. membronica* Berth., *H. artonilla* Hagenm., *H. astonara* Hagenm., *H. pleurabdota* B., with *v. cacista* B. and *v. vaganensis* Hag., *H. perlutosa* Hag., *H. syntela* B., *H. saharica* B., *H. ischurostoma* B., *H. nahrouasselina* B., *H. honorati* B., *H. moricola* Pal., *H. tenietensis* B., *H. gibilmanica* Serv., *H. polytrichia* Anc., *H. longipila* Mss., *H. vestita* Ramb., *H. dumivaga* Mouss., *H. trutatiana* Fag., *H. renei* Fag., *H. oreina* Fag., *H. montivaga* Fag., *H. suborcina* Fag., *H. seirensis* Fag., *H. bradygyra* Fag., *H. carascalopsis* Fag., *H. esserana* B., *H. nansoutyana* B., *H. oppidi* Fag., *H. transfuga* Fag.

Section *Monilearia* Mousson. 1872.

Monilearia MOUSS., Rév. Faun. Mal. Canaries, p. 39.

In referring these minutely perforate, mostly well keeled forms to the *Xerophila* series, I am departing from ordinary usage, which has associated them with the Maderian group *Lemniscia*. In general appearance and sculpture, as well as in the structure of the basal lip, they do not agree with *Lemniscia* as well as with *Obelus*, *Candidula*, *Jacosta*, etc.

No type having been nominated for this group, I consider *H. phalerata* Webb & Berthelot such. The species are confined to the Canary Islands.

- | | |
|-----------------------------------|--------------------------------------|
| H. monilifera W. & B., iv, 20. | H. cæmentitia Sh., iv, 20. |
| H. lancerottensis W. & B., iii, | H. tumulorum W. & B., iv, 19. |
| v. webbii Lwe. | [237. ? <i>atomata</i> Mke., iv, 21. |
| v. bertheloti Lwe. | H. oleacea Sh., iv, 20. |
| v. adoptata Mouss. | v. deusta Lwe. |
| H. persimilis Shutt., iv, 19. | H. woodwardia Tarn., iv, 20. |
| v. præposita Mss. | H. watsoniana Woll., iv, 21. |
| v. devia Mouss., iv, 20. | H. lemniscata W. & B., iv, 21. |
| H. phalerata W. & B., iv, 19. | H. orbigny W. & B., iii, 237. |
| <i>rosetti</i> W. & B. | <i>orotavana</i> Tarnier. |
| <i>nivariensis</i> Sh., Rve. | v. <i>mitigata</i> Mouss. |
| H. umbicula Sh., iv, 21. | v. <i>calcareæ</i> Mouss. |
| <i>roseti</i> Pfr. not W. & B. | H. phryganophila Mab. |
| <i>phalerata</i> Pfr. not W. & B. | H. dendrophila Mab., iii, 237. |
| | H. aglaometa Mab., iii, 237. |

Section *Jacosta* Gray, 1821.

Jacosta GRAY, London Med. Repos., xv, March 1, 1821, p. 236, only species mentioned *H. Jacosta albella* Drap.=*explanata* Müll.—*Numidia* ISSEL, Ann. Mus. Civ. Genov. xxii, 1885, p. 8, 9, type *H. idia* Bgt.—*Xerofalsa* MONTS., Moll. Terrest. delle Isole adiacenti alla Sicilia, 1892, p. 21 (for *H. idia*, *enica*, *zougitana*).—*Xerosecta* MONTS., l. c. (for *H. explanata*).—*Xeroplana* MONTS., l. c. (for *H. doumeti*, *depressula*).—*Xerotropis* MONTS., t. c., p. 23 (for *gargottæ*, *jolyi*, *prietoi*, *ledereri*, *milaschewischii*, *spratti*).—*Xeroamanda* MONTS., t. c., p. 22 (for *amanda*, *usticensis*).—*Xeromoesta* MONTS., l. c. (for *moesta*, *kabyliana*, *dormiens*, *dohrni*).—*Xerocodia* MONTS., t. c. p. 23 (for *montserratica*, *penchinati*, *barneana*).—*Xeroplexa* MONTS. l. c. (for *setabulensis*, *nyelli*, *coronadoi*).—*Tropidocochlis* LOCARD, Exchange ix, p. 97, 1893, type *H. explanata*.

Shell umbilicated, the whorls flattened above, acutely keeled at periphery, and convex beneath; surface costulate, striate or smoothish; solid and earthy, whitish with or without bands, the apex black or light. Aperture angled, the lip rather blunt, not expanded. Type *H. explanata* Müll., pl. 68, figs. 23, 24.

Jaw arcuate and ribbed. Genital system (pl. 69, fig. 15, *H. explanata*) with the flagellum rather longer than usual in the genus; dart sack slightly bilobed at apex and containing two darts; mucus glands numerous.

H. explanata shows clearly the transition between the species with one and those with two dart sacks. The second sack is formed by splitting of the first. In some other species of this keeled group the sack is apparently single and simple, as Schuberth has figured it for *H. syrosina*.

Jacosta is in all probability a purely artificial group, containing keeled forms which have arisen from several diverse stocks of unkeeled *Helicellas*; but only a thorough study of the shells and anatomy of many species can demonstrate the true origin of the several forms.

- | | |
|---|---|
| <i>H. agona</i> Anc. | <i>H. crenimargo</i> Kryn., iii, 252. |
| <i>H. amanda</i> Rm. | <i>piatigorskiensis</i> Bayer. |
| <i>limbata</i> Phil. | <i>H. depressula</i> Parr., iii, 256. |
| v. <i>dormiens</i> Ben., iii, 252. | <i>forms</i> <i>globulosa</i> , <i>flammulata</i> , |
| v. <i>insularis</i> Iss. | <i>zonata</i> , <i>fulva</i> , <i>compressa</i> Bgt., |
| <i>H. amphiconus</i> Malz., viii, 180. | <i>exserta</i> , <i>murustagensis</i> West. |
| <i>H. argonautula</i> W. & B., iv, 42. | <i>H. doumeti</i> Bgt. |
| <i>typica</i> and <i>canariensis</i> Mss. | v. <i>lacostean</i> a Mor., iii, 255. |
| <i>renati</i> Dautz. | <i>H. eminens</i> West., viii, 180. |
| <i>H. arianensis</i> Bgt., iii, 253. | <i>syrensis</i> v. <i>exserta</i> Mts. |
| <i>H. barceloi</i> Hid., iii, 257. | <i>H. enica</i> L. & B., viii, 182. |
| <i>H. barneyana</i> Anc., viii, 183. | <i>H. eugoniostoma</i> Bgt. |
| <i>theodori</i> Anc. <i>ms.</i> | <i>H. explanata</i> Müll., iii, 255. |
| <i>H. biangulosa</i> Mts., iii, 178. | <i>albella</i> Dr. |
| <i>H. boissyi</i> Terv., iii, 254. | <i>f. minor</i> Bgt. |
| v. <i>frater</i> D. & H., iii, 258. | <i>f. subscalaris</i> Bgt. |
| <i>H. brondeli</i> Bgt., iii, 255. | <i>H. filimargo</i> (Z.) Rm., iii, 251. |
| <i>H. cardonæ</i> Hid., iii, 258. | <i>taurica</i> Partch. |
| <i>H. caroli</i> D. & H., iii, 258. | <i>chersonesica</i> Mühl. |
| <i>H. cavannæ</i> Paul, iii, 259. | <i>H. finitima</i> Mor., iii, 241. |
| v. <i>scissa</i> Paul. | <i>H. gradilis</i> Mts., viii, 179. |
| <i>H. cavimargo</i> Mts. | <i>H. graja</i> West. |
| <i>H. cisternosi</i> Hid., iii, 259. | v. <i>philesia</i> West. |
| <i>H. columbina</i> West. | <i>H. granostriata</i> Mouss., iv, 43. |
| <i>H. corrugata</i> Gmel., iii, 252. | <i>H. grovesiana</i> Paul, iii, 254. |
| <i>rugosa</i> Chem. | <i>H. hamudæ</i> Kob., viii, 182. |
| <i>groyana</i> Fér. | <i>H. hariotiana</i> Bgt. |
| <i>gargottæ</i> Phil. | <i>H. henoniana</i> Bgt., iii, 254. |
| v. <i>pleurischurra</i> Bgt. | v. <i>agriunensis</i> Kob. |
| v. <i>chonomphala</i> Bgt. | <i>H. homeyeri</i> D. & H., iii, 257. |

- | | |
|------------------------------------|----------------------------------|
| H. idia L. & B., iii, 256. | H. rozeti Mich., iii, 254. |
| H. ledereri Pfr., iii, 259. | v. oxygyra West. |
| f. regularis Roth. | H. rozetopsis L. & B. |
| H. moraguesi Kob., iii, 255. | H. setabulensis Pfr., iii, 256. |
| H. micropristis Anc. | serrula Morel. |
| f. appressispira Anc. | H. siderensis Malz., viii, 181. |
| H. milaschewitschi Ret. | H. sigensis Kob., iii, 256. |
| H. morata Mouss., iv, 43. | f. jolyi Pech., Anc. |
| H. montserratensis Hid., iii, 257. | H. siphnica Kob. |
| H. multipunctata Mouss., iv, 43. | H. spratti Pfr., iii, 253. |
| H. nummuliformis Ret. | siderites Friv. |
| H. nyelii Mitt., iii, 258. | v. perplanata Pils., viii, 181. |
| H. orophea West. | H. syrensis Pfr., iv, 28. |
| H. parableta Bttg. | H. syrosina Bgt. |
| H. pollenzensis Hid., iii, 257. | H. tineana Ben., iii, 253. |
| H. ponsii Hid., iii, 257. | v. mista West. |
| H. ponsonbyi Kob., viii, 183. | v. kobeltiana W. |
| H. praeclara Caf., iii, 252. | H. tissotiana Bgt. |
| H. prietoi Hid., iii, 257. | H. tristrami Pfr., iii, 253. |
| H. pulverulenta Lwe., iv, 43. | H. usticensis Calc., iii, 254. |
| H. retowskii Cless., iii, 252. | H. zeugitana L. & B., viii, 182. |
| H. rouvieriana Bgt., iii, 255. | |

Insufficiently known forms of Jacosta: H. chola Pech., caficii (Ad.) West., hierica Bgt., tineiformis Let. & Bgt., soleilleti Bgt., hodnae Anc., melosina Bgt., sageti Bgt., orphea West., morini, chthamalo-lena, ablennia, hyperconica and tellica Bgt., eufidana callistoderma and conicula Let. & Bgt., mitidjana and bibanensis Anc., euphacodes and sphakiota Malz.

Section *Xeroleuca* Kobelt, 1877.

Xeroleuca KOB., Jahrb. D. M. Ges. 1877, p. 25.—*Conf.* Schepman, Jahrb. 1877, p. 271, 272, anat. of *mograbina* and *degenerans*.

Shell depressed and widely umbilicated, solid, whitish and *chalky*, having one, two or three spiral keels; *surface roughly sculptured*. Type *H. turcica* Chemn.

The species are mostly from Morocco. Genital system (pl. 69, fig. 11, *H. mograbina*) substantially as in *Helicella ericetorum*, but the dart sacks are smaller.

- | | |
|-------------------------------|-----------------------------------|
| H. conopsis Mor., iv, 22. | H. mogadorensis Bgt., iv, 22. |
| H. turcica Chemn., iv, 22. | H. cyclostremoides Sby., iv, 256. |
| <i>cratera</i> Schum. | H. mograbina Mor., iv, 22. |
| v. tetragona Mor., iv, 21. | H. darolli (Let.) Bgt. |
| H. degenerans Mouss., iv, 22. | v. djarica Bgt. |
| f. validior Mouss. | H. tunetana Pfr., iv, 21. |

Section *Obelus* Hartmann.

Obelus HARTM., Erd- und Süßwasser-Gast. Schweiz, p. 158, type *O. preauxii*.—*Xeroptyca* MONTS., Moll. Terr. Is. adi. alla Sicil., 1892, p. 25, type *H. "ptycodia" = ptychodia*.

Shell *trochiform*, with narrow umbilicus, acutely *keeled and serrate periphery* (at least when young), with usually a secondary keel or series of tubercles midway between periphery and suture; solid, whitish and earthy. Aperture basal, angular-oval, the lip simple but slightly dilated at columella. Type *H. despreauxii*.

Genital system (pl. 69, fig. 12, *H. tuberculosa*, typical); penis having a subterminal elongated appendix; other organs as in *Helicella ericetorum*, but dart sacks small.

Distribution, Canary Is., eastward to Syria. A very natural group, consisting of one series of species in Morocco and the Canary Is. and another in Lybia to Palestine. Monterosato's name *Xeroptyca* belongs to the latter, but it seems unnecessary to make any separation, and the term is etymologically bad.

- | | |
|-------------------------------|------------------------------|
| H. tuberculosa Conr., iv, 25; | H. pumilio Pfr., iv, 27. |
| [viii, 184. | v. cyclodon W. & B., iv, 26. |
| v. serrulata Bk., iv, 25. | H. despreauxii Orb., iv, 25. |
| H. philammia Bgt., viii, 185. | <i>preauxii</i> Hartm. |
| H. ptychodia Bgt., viii, 184. | v. immodica Mouss. |
| H. agenora West. | H. moderata Mouss., iv, 26. |
| H. berenice Kob., viii, 185. | H. mirandæ Lwe., iv, 26. |
| H. lybica Pons., viii, 185. | <i>nodosostriata</i> Mouss. |
| H. hesperidum Mor., iv, 26. | |

Section *Trochula* Schlüter, 1838.

Turricula BECK, Index Moll. 1837, p. 10, not *Turricula* Schum. Essai, 1817, p. 217 (*Pleurotomidæ*).—? *Oxynota* HARTM., Erd- und Süßwasser-Gast. Schweiz, 1842, p. 159, a nude name; no species mentioned.—*Crenea* ALBERS, Die Hel. 1850, p. 77, in part, not

Creneia Risso, 1826.—? *Trochoida* or *Trochoidea* BROWN, Ill. Conch. G. B. 1827 (publication not seen).—*Xeroclivia* MONTS., Moll. Terr. Is. adiac. alla Sicil., 1892, p. 25 (for *H. pyramidata*).—*Xeronexa* MONTS., l. c. (for *H. cumice*, *calcarata*).—*Xerocochlea* MONTS., l. c. (for *H. caroni*, *elata*).—*Trochula* SCHLUTER, Syst. Verz., p. 7, 1838.—MORCH, Journ. Conch. 1865, p. 386.

Shell solid and earthy, narrowly umbilicated, trochoidal, with conic spire, narrow whorls and rather flattened base; periphery somewhat angular or sharply keeled. Aperture small, lunate or angular, the lip not expanded, strengthened by a submarginal rib within. Type *H. terrestris* Penn., pl. 68, fig. 27.

Jaw with 8 to 18 close, flat ribs (pl. 67, fig. 12, *H. terrestris*).

Radula (pl. 67, fig. 16 *H. terrestris*) with mesocone about the length of basal-plate on median teeth, the side cutting points well developed. Laterals the same, but lacking entocones; on the transition teeth the inner cusps become bifid, and on marginals the ectocone also splits.

Genitalia (pl. 69, fig. 18 *H. elegans*); dart sacks two, very small. Mucus glands 6. At base of vagina or on the atrium a large sack-like appendicula. Other features as in *Helicella* generally.

Mainly a circum-Mediterranean group, distinguished from *Obelus* by the simpler sculpture of the shell and the characters of genitalia mentioned above.

The name proposed by Brown in 1827, may prove to have first claim for this group, but I have not seen the original publication and it is variously spelled by the authors who have quoted it. In any case, *Turricula* must be rejected from the nomenclature of Helices, being preoccupied in Mollusca.

<i>H. newka</i> Dohrn, iv, 29.	<i>H. terrestris</i> Penn., iv, 29.
<i>H. newkopsis</i> L. & B.	<i>elegans</i> Gmel.
<i>H. majoricensis</i> D. & H., iii, 258.	<i>trochulus</i> Hartm.
<i>H. miscella</i> West.	<i>H. scitula</i> C. & J., iv, 29.
<i>H. caroni</i> Dh., iv, 29.	<i>trochilus</i> Poir.
v. <i>pyramis</i> Phil., iv, 30.	<i>depressa</i> Bk.
<i>H. elata</i> F.-B., iv, 29.	<i>perdepressa</i> West.
v. <i>dilatata</i> Ben.	<i>H. trochoides</i> Poir., iv, 27.
<i>H. trochlea</i> Pfr., iv, 30.	<i>algira</i> Chier.
<i>H. sequentiana</i> Ben., iv, 30.	<i>solarium</i> Risso.

v. pyramidella Jan.	<i>sabulosa</i> Zgl.
v. sulculata C. & J.	<i>spectabilis</i> Zgl.
<i>rugosiuscula</i> Mich.	<i>pyramidatoides</i> Orb.
v. vidua West.	v. nova Paul.
v. infulata Paul.	v. depressa Bgt.
v. conica Drap.	v. tarentina Pfr., iv, 24.
H. turritella Parr., iv, 27.	H. apiculus Rm., iv, 29.
<i>f. remissa</i> Parr.	<i>cunice</i> Calc.
H. verticillata Parr., iv, 27.	H. numidica Moq., iv, 24.
H. liebtruti Alb., iv, 28.	v. sulliottii Poll.
H. idaliæ Bgt., iv, 28.	H. calcarata Ben., iv, 28.
H. pyramidata Drp., iv, 23.	H. schembrii Scac., iv, 28.
<i>agnata</i> Zgl.	<i>schombrii</i> err. orig.
<i>arenaria</i> Zgl.	H. cucullus Mts., iv, 28.
<i>littoralis</i> Zgl.	H. inops Mouss., iv, 26.

Insufficiently known species: H. crenulata Müll., H. licodiensis Cafici, H. pupilla Serv., H. eupyramis, spællina, kelibiana, spælla, zitoumica, madana, galactina, veneriana Let. & Bgt., H. tisemsinica, mactanica, capuana, dyrrachiensis Bgt., H. apiculiformis Anc., H. subnumidica (Bgt.) West., H. ogygiaca West. See also iv, p. 30.

Section *Cochlicella* Risso, 1826.

Cochlicella (Fér.) RISSO, Hist. Nat. Eur., Mérid. iv, p. 77.—MARTENS, in Alb., Die Hel., p. 117.—*Elisma* LEACH, in Turton, Man. L. and Fr.-W. Sh. Brit. Is., p. 84, 1831.—*Xeroacuta* MONTS., Moll. Terr. Is. adi. Sicil., 1892, p. 25, proposed for *H. acuta*, *ventrosa*. For anat. see MOQ.-TAND., Moll. Fr., FISCHER, Journ. de Conch., 1856, p. 121, SCHMIDT, Stylom., p. 41, MOSS & PAULDEN, Manchester Mic. Soc. Trans. 1892, p. 75.

Shell perforated, with elongate, turrited spire, higher than wide; opaque and white, usually streaked or banded with brown or waxen; whorls rounded, at least the last one. Aperture oval, the lip simple and acute, expanded toward the columellar insertion. Type *H. barbara* L., pl. 68, fig. 29.

Genitalia: penis of the usual form, the retractor inserted in an obliquely truncated, cylindrical calcareous body at its apex (pl. 69 fig. 21), in which the long epiphallus terminates; flagellum short. Vagina without appendages; but on the atrium there is a long organ of unknown function, either a degenerate dart sack or an "ap-

pendix" (pl. 69, figs. 19, 20, 21, *H. acuta*; fig. 21 upper part of penis outlined, through which is seen the calcareous ring in which the epiphallus ends, with attached retractor). The spermatophore (fig. 20, x 8) is very long, oval in section, chitinoid in substance, with an elevated closely serrate edge. In *ventricosa* and *conoidea* mucus glands and a small dart sack are present.

Distribution: middle and southern Europe, northern Africa, etc. *H. ventricosa* introduced into Bermuda and very abundant there.

The absence of mucus glands in *H. barbara* is remarkable, and doubtless the result of degeneration. The spermatophore is similar to that of *Leptaxis* which also has a similar boot-shaped spermatheca.

H. barbara L., iv, 32.

acuta Müll.

meridionalis Risso.

fasciatus Penn.

v. *terveriana* Mouss.

H. conoidea Drap., iv, 31.

fibula Wood.

turbida Küst.

solitaria Pfr.

v. *calaritana* Paul.

H. ventricosa Drap., iv, 32.

ventrosa Auct.

bulimoides Moq.

H. pringi Pfr., iv, 32.

H. bellucciana Bgt.

H. duplicata Mouss., iv, 31.

H. contermina Sh., iv, 31.

psammoica Morel.

H. psammæcia Bgt.

H. psammæcella Let. & Bgt.

Subgenus THEBA Risso, 1826.

Theba (Leach MS.) Risso, Hist. Nat. Eur. Mérid. iv, p. 73, in part.—WESTERLUND, Fauna, p. 71, in part.—*Teba* Leach, in TURTON, Man. Land and Fresh-water Sh. Brit. Is., 1831, p. 36 (in part).—*Zenobia* GRAY, Lond. Med. Repos., xv, March, 1821, p. 239 (for *H. Zenobia corrugata*, undescr. and unfig., and *H. Zenobia "binarginata"* = *H. carthusianella* Drap.). Not *Zenobia* OKEN, 1815 (Lepidoptera).—*Euomphalia* WESTERLUND, Fauna Paläarct Binnenconch., *Helix*, pp. 31, 92 (1889).—*Carthusiana* KOBELT, Catalog der im Europ. Faunengebiet lebenden Binnenconchyl. p. 11, 1871.—See for anatomy, HESSE, Jahrb. D. M. Ges. 1884, p. 234, pl. 5.—SCHMIDT, Stylom., pl. 7.—MOQ.-TAND., Moll. Fr. pl. 16.—ASHFORD, Journ. Conch. Leeds, iv, pl. 10.—SCHUBERTH, Arch. Naturg. 1892, pl. 2.—v. IHERING, Morphol. u. Syst., p. 440.

Shell depressed-subglobose, narrowly umbilicate or imperforate, whitish or banded with white, but rather thin and somewhat translu-

cent, the surface *finely malleated, shining*; last whorl wide, slightly descending. Aperture wide-lunar, but little oblique; lip acute, slightly expanded below, strengthened within by a distinct submarginal rib. Type *H. carthusiana* Müll., pl. 68, figs. 25, 26.

Jaw with numerous flat, close ribs. Marginal teeth with an abnormally large number of denticles, at least in some species. Penis short and swollen, passing into an epiphallus which ends in a short flagellum and the vas deferens; *no retractor muscle*. Mucus glands inserted high on vagina, at root of spermatheca duct, and consisting of three pairs of tubes. Far below them is a long blind sack with plicate internal walls, but *containing no dart*, evidently a degenerate dart sack. Spermatheca irregular-oblong, its duct long and branchless. Right eye retractor not passing between branches of genitalia (pl. 69, fig. 22, *H. carthusiana*. Pl. 69, fig. 16, *H. syriaca*. Pl. 69, fig. 14, *H. cantiana*). The arrangement and number of mucus glands varies in the different species.

Distribution, middle and southern Europe and Asia Minor.

The group is well distinguished by the whitish but still somewhat translucent, finely malleated shell, with conspicuous lip-rib, as well as by the lack of penis retractor muscle (cf. *Cepolis*) and the lack of a dart in the lengthened but evidently degenerate dart sack.

Risso's genus *Theba* contained ten species of several groups, but after eliminating the first three and last two, which were removed by subsequent authors to other groups, *Euparypha*, *Cochlicella*, etc., we have left five forms of the *H. carthusiana* type. Westerlund has made these the basis of *Theba*; and it seems better to follow his example rather than to legislate the group completely out of existence as we would be compelled to do were we to adopt Kobelt's name *Carthusiana*, proposed in 1871. The latter name is, moreover, objectionable from being the duplication of a specific name, although this alone would not bar its acceptance. Gray's *Zenobia* is founded upon a species of this group, but is preoccupied. It has been used hitherto in a totally incorrect manner by European writers, evidently from failure to consult the original paper in which it was proposed. Westerlund's group *Euomphalia* is founded on *H. strigella* and its allies, which are anatomically like *Theba*.

- | | |
|-------------------------------------|---------------------------------------|
| H. alphabucelliana Paul., iii, 204. | <i>ducampi</i> Villa. |
| H. anconæ Iss., iii, 192. | <i>f. carfaniensis</i> Stef. |
| <i>oliviaria</i> , Iss., olim. | <i>v. marchetti</i> Stef. |
| <i>rubella</i> Risso. | <i>v. simplicita</i> Parr., iii, 194. |

- H. apennina Mühl, iii, 202.
 H. arpatschaiana Mss., iii, 177.
 v. pseudoglobula Mss., iii, 197.
 H. berytensis Fér., iii, 194.
 v. rachiodia Bgt., iii, 194.
 granulata Roth.
 v. fourousi Bgt., iii, 194.
 H. cantiana Mont., iii, 192.
 pallida Jeffr.
 f. cantianiformis Bgt.
 H. carthusiana Müll., iii, 195.
 arenaria Oliv.
 olivieri C. Pfr.
 binarginata Gray.
 gibsi Leach.
 f. carthusianella Dr.
 rufilabris Jeffr.
 innoxia Bgt.
 f. fasciata West.
 f. leucoloma Stab.
 f. claustralis Parr.
 v. *radiata* West.
 v. *archimedeia* Ben.
 v. *ventiensis* (B.) Fag.
 v. *diurna* Bgt., iii, 193.
 v. *leptomphala* Bgt.
 v. *encyæ* Serv.
 v. *euscepiæ* Serv.
 v. *conoidea* Branc.
 v. *glabella* Drap., iii, 186.
 v. *sarriensis* Pena, iii, 193.
 v. *episema* (B.) Serv.
 v. *lamalouensis* Reyn.
 taurinensis Pini.
 f. arvensis Pini.
 H. cemenenea Risso, iii, 193.
 galloprovincialis Dup.
 vars. *campanica* Paul, *ousteræ*
 Mab., *monerebia*, *gaude-*
 froyi, *abebaia*, *apuana* Mab.,
 riparia Bl., *ardesa*, *sobara*,
 iadola Bgt., *putoniana*
 (Mab.), Loc., iii, 194, *rees-*
 manni Cless., *delacuri* Mab.
 = *delacourti* Mab., Bgt.
 H. flaveola Kryn.
 H. flavolimbata Bttg., iii, 201.
 H. globula Kryn., iii, 197.
 v. *nana* Bttg.
 H. helvola Friv., iii, 202.
 v. *martensi* West.
 H. hirei Cless.
 H. holotricha Bttg.
 H. martensiana Tib., iii, 203.
 lavata Tib.
 H. mnenia West.
 H. obstructa Fér., iii, 196.
 obstrusa Fér.
 f. dilatata West.
 f. adpressula Friv.
 H. olivieri Fér., iii, 191.
 v. *parumcincta* Parr.
 v. *bicineta* Ben.
 rizzæ Arad.
 v. *cribrata* West.
 v. *gregaria* Zgl., iii, 196.
 occulta Biv.
 H. orsinii (Porro) Villa, iii, 203.
 ochracea Zieg.
 v. *majellæ* Kob.
 v. *picena* (Tib.) Kob.
 H. pachnodes Bttg.
 H. pantanellii Stef.
 H. parreyssi Pfr., iii, 203.
 modesta Parr.
 H. phæozona Mts., iii, 205.
 H. pisiformis Pfr., iii, 197.
 v. *atypa* Bttg., viii, 187.
 H. rothi Pfr., iii, 197.
 f. inversa West.
 f. draxleri Zel.
 H. rubens Mts., iii, 205.

- | | |
|--|---|
| <i>f. concolor</i> Mts. | <i>piligera</i> Andr. |
| <i>f. finschiana</i> Mts. | <i>vitrinosa</i> Zgl. |
| <i>f. zeiliana</i> Mts. | <i>hexagyra</i> Mühl. |
| <i>f. regeliana</i> Mts. | <i>peregra</i> Parr. |
| <i>H. rufispira</i> Mts., iii, 204. | <i>v. colliniana</i> , <i>lepidophora</i> , <i>rus-</i> |
| <i>v. albidorsalis</i> Mouss. | <i>inica</i> , <i>separica</i> , <i>vellavorum</i> , |
| <i>H. samsunensis</i> Zel. | <i>ceyssoni</i> , <i>buxetorum</i> , <i>neme-</i> |
| <i>H. schotti</i> (Zel.) Pfr. | <i>tuna</i> , <i>cussetiensis</i> , <i>mehadiae</i> , |
| <i>H. schrenki</i> Midd., iii, 200. | <i>agapeta</i> Bgt., <i>briandi</i> , <i>du-</i> |
| <i>siberica</i> Friv. | <i>breili</i> Serv. |
| <i>H. semenowi</i> Mts. | <i>H. subobstructa</i> Bgt., iii, 196. |
| <i>f. depressa</i> Mouss. | <i>v. distypa</i> West. |
| <i>H. septemgyrata</i> Mss., iii, 201. | <i>H. suborbicularis</i> Mts., iii, 203. |
| <i>H. strigella</i> Drap., iii, 202. | <i>H. syriaca</i> Ehr., iii, 197. |
| <i>sylvestris</i> Alt. | <i>onychina</i> Rm., f. 568. |
| <i>altenana</i> Gartn. | <i>H. talyschana</i> Mts., iii, 195. |
| <i>fruticosa</i> Parr. | <i>H. theobaldi</i> West. |
| <i>cornea</i> Hartm. | <i>H. transcaspia</i> Bttg., viii, 187. |

Section *Lejeania* Ancey, 1887.

Lejeania ANC., Conchol. Exch. i, p. 75, June, 1887, types *H. darnaudi* Pfr., *isseliana* Morel., *jickeliana* Nev.—*Pella*, in part, of authors.

Shell narrowly umbilicated, depressed-globose, thin, with the texture of *Fruticicola*; brown with opaque whitish bands, or opaque-white with dark bands. Lip thin, simple, expanded toward the umbilical insertion. Type *H. darnaudi* Pfr.

Jaw high-arched, with numerous flattened, wide ribs, hardly denticulating the margin (pl. 71, fig. 43, *H. scioana*). Radula having the middle teeth tricuspid, median cusp shorter than basal-plate. Laterals bicuspid; marginals with the ectocone split (pl. 71, fig. 42, *H. scioana*).

Genital system (pl. 71, fig. 44, *H. lejeaniana*) with no retractor on penis, flagellum long. Spermatheca on a short duct. Dart sack short, swollen, inserted on atrium; mucus glands in two groups of 3 or 4 each (*lejeaniana*), or wanting apparently (*scioana*).

Distribution, Abyssinia, southern Arabia. My knowledge of the anatomy of this group is from Pollonera's work Boll. Soc. Mal. Ital. xiii, p. 75, pl. 3. *The position of the right eye-retractor is unknown.*

No penis retractor is shown in Polloneras's figures or mentioned by him, so I suppose it is absent; and it is mainly on this ground that I place the group next to Theba. The hairy species may belong elsewhere, but judging from the anatomy of scioana, they are better placed here. The shell diagnosis given above applies to the typical forms.

- | | |
|------------------------------------|------------------------------------|
| H. isseli Morel., iii, 105. | H. jickelii Nev., iii, 230. |
| <i>darnaudi</i> Jick. part. | H. pilifera Mart., iii, 190. |
| H. lejeaniana Bgt., iii, 104. | H. combesiana Bgt., iii, 190. |
| <i>darnaudi</i> Jick. part. | <i>pilifera</i> Jick. |
| H. achilli Bgt., iii, 105. | H. ferretiana Bgt., iii, 190. |
| H. darnaudi Pfr., iii, 104. | H. herbini Bgt., iii, 190. |
| v. heuglini Mts., iii, 104. | H. galinieriana Bgt., iii, 190. |
| H. hamacenic Raff., iii, 250. | H. beccarii Jick., iii, 189. |
| H. subnivellina Bgt., iii, 250. | <i>ciliata</i> Morel. |
| H. nivellina Bgt. | H. scioana Poll., viii, 190. |
| <i>alexandrina</i> Parr., undeser. | H. d'hericourtiana B., iii, 104. |
| <i>nivea</i> Zgl. not Gmel. | H. strigelloides Poll., viii, 190. |
| H. leucosticta Mts., viii, 190. | |

Section *Platytheba* Pilsbry, 1894.

Nummulina KOB., Catalog Eur. Binnenconch., p. 12, 1871. Not *Nummulina* d'Orbigny, 1826 (Polyzoa).

Shell narrowly umbilicated, depressed and *lens-shaped*, *acutely keeled*; thin but rather solid, costulate striate, whitish. Aperture quite oblique, transverse, and angular outside; peristome simple above, the basal lip slightly thickened within and dilated at insertion. Type *H. nummus* Ehr., pl. 68, fig. 30.

Genital system (pl. 69, fig. 17, *H. nummus*) as in *Theba*, the penis lacking retractor, flagellum very short, etc.

These are simply keeled Carthusianas, as von Ihering has already maintained, but the shell features demand recognition by name. The group is characteristic of Syria and the Caucasus region. It has no alliance with *Plectotropis*, although the shells are somewhat similar.

- | | |
|-----------------------------|------------------------------------|
| H. nummus Ehr., iii, 199. | H. prometheus Bttg., iii, 199. |
| <i>hedenborgi</i> Pfr. | H. genezarethana Mouss., iii, 199. |
| <i>oxygyra</i> Boiss. | <i>tiberana</i> Mouss. |
| H. spiroxia Bgt., iii, 199. | H. jasonis Dub., iii, 199. |

Genus HYGROMIA Risso, 1826.

= *Hygromia* Risso, 1826, + *Bradybena* Beck, 1837 (part), + *Fru-
ticolica* Held, 1837, + *Monacha* Fitz., 1833, + *Trichia* Hartm., 1841 ?
+ *Petasia* Beck, 1837, + *Metodontu* Mlldff., 1886, etc., etc.

Shell rather thin and subtranslucent, with little calcareous substance, brown or whitish, unicolored or with a peripheral white zone, frequently hairy. Umbilicus open or minute; form globose-depressed, with convex or conoid spire, and rounded or angular periphery. Aperture lunate, the lip acute, expanded below, usually thickened within, the basal margin rarely 1 or 2 toothed. Type *H. cinctella* (See pl. 55, figs. 20 to 30).

Jaw arched, thin, with delicate low riblets which denticulate the margins but feebly (pl. 70, figs. 31, 39). Radula as usual in ground-snails. Median cusps long and acute, the side cusps usually developed though small on middle teeth. Ectocones well developed on lateral teeth. Marginals with long simple or bifid inner and small simple or split outer cusp.

Genital system (pl. 70, figs. 30-41); penis continued in an epiphallus which bears the retractor and ends in a short flagellum and the vas deferens. Dart sack single or repeated, with or without accessory sacks, the contained dart or darts cylindrical below with short blades at apex. Mucus glands inserted on vagina above the dart sack, consisting of several independently inserted or grouped tubes. Right eye-retractor passing between branches of genitalia. Dart apparatus sometimes entirely lacking by degeneration.

Distribution, Europe, North Africa and Western Asia.

The genus is not very fully represented in the fossil series as now known, although a moderate number of forms are found extending as far down as the Oligocene of middle Europe. I do not know that any Eocene or earlier species can be referred with certainty to the group, but it is not unlikely.

The prominent features of this genus are (1) the thin dull-colored shell, in which calcareous matter is never predominant, a hairy coat is often developed, and the lip is not reflexed; (2) the thin jaw with many slight riblets; (3) the normal disposition of the right eye-retractor, the short flagellum, frequent doubling of the dart sack and the separation of mucus glands from the latter. These features separate the genus from *Helicella*, which is allied in form of the

shell and of the genital organs, and from *Eulota* which has a shell of much the same form and texture.

In certain forms (*H. revelata*, *H. ciliata*, and the section *Metafruticicola*) the dart sack and mucus glands are absent; but as there are other species showing the gradual steps of this loss,—first in the empty condition of the dart sacks, then their disappearance, and finally the gradual disappearance of the mucus glands also,—we are compelled to consider these simplified species as degenerate and *secondarily* simple lines of descent. It is noteworthy that in shell, jaw and teeth they retain the normal structure of the genus, as well as in the structure of the penis.

The presence of these forms lacking the cardinal features of the *Belogona* might be construed by some as invalidating the premises upon which the primary groups of *Helices* are founded; but this would be a very short-sighted view. The facts simply show that in some members of highly organized groups, retrogressive evolution has taken place, resulting in structures similar to those characteristic of lower groups. This is a very common phenomenon in many orders of animals. In the case under discussion, the organs of mastication and the shell have undergone no changes, and the penis and its appendages retain their normal characters. Compare v. Ihering, *Morphol. u. Syst.*, p. 450, who supports this view.

In regard to the nomenclature adopted for the group, I have simply made the changes from current usage demanded by the law of priority. It is absurd to continue to use "*Fruticicola*" in a generic sense when it is everywhere acknowledged that *Hygromia* is a dozen years earlier, and is properly diagnosed, etc.; in a work known to and used by all systematic conchologists. *Fruticicola* is later than *Monacha* (type *incarnata*) and on a par with *Bradybæna*. The names *Zenobia*, *Petasia*, *Trochiscus*, *Latonia* and *Trichia* are clearly preoccupied, and can, therefore, have no place in the nomenclature of *Helices*. They have hitherto been used in ignorance of this fact, or in defiance of it.

The sectional scheme proposed below is remodelled from current European usage, except that *Theba* and allied groups have been removed to *Helicella*, as advocated by von Ihering, and the preoccupied names are dropped. The species herein referred to sections *Monacha* and *Fruticicola* require much investigation, and doubtless considerable re-arrangement, and some students may consider it best to split them into more sections. The other sectional divisions agree

in essential points with recent European authorities, and seem to be well-founded.

Section *Hygromia* Risso, s. str.

Shell subconic, narrowly perforated, with convex-conic spire, *keeled periphery* and convex base; horn-colored or brown, somewhat translucent, with *an opaque white peripheral girdle*. Surface smoothish, not hairy. Aperture oblique, lip expanded below, reflexed at columellar insertion, thickened within. Type *H. cinctella*, pl. 55, figs. 20, 21.

Jaw arcuate, with many wide, flat riblets (pl. 70, fig. 39, *H. cinctella*). Genitalia (pl. 70, fig. 32 *H. limbata*), having the epiphallus long, flagellum very small. Four mucus tubes on each side, and below them one small dart sack containing a dart. Duct of spermatheca long.

Species few, confined to southern-central Europe.

<i>H. cinctella</i> Dr., iii, 187.	<i>H. limbata</i> Dr., iii, 189.
<i>?ranzani</i> Orsini.	<i>f. sublimbata</i> Bgt.
<i>f. fasciata</i> Paul.	<i>f. odeca</i> Bgt.
<i>f. chelydea</i> West.	<i>f. hylonomia</i> Bgt.
<i>H. tassyi</i> Bgt.	<i>v. delomphala</i> Anc.

Section *Monacha* Fitzinger, 1833.

Monacha FITZ., l. c., for *incarnata* only.—Not *Monachus* Kaup, 1829 (Aves).—*Latonia* WESTERLUND (in part), Fauna Paläarct. Binnenconch., *Helix*, pp. 30, 68. Not *Latonia* Mey., 1843 (Reptilia), nor *Latona* Schum. 1817 (Moll.) nor of Strauss, 1817 (Crust.).

Shell covered-perforate or narrowly umbilicated, depressed subglobose with 6–7 whorls, the last rounded or subangular; surface minutely scaly or hairy. Aperture oblique, widely sublunate, lip expanded, well thickened within. Type *H. incarnata* Müll., pl. 55, figs. 29, 30.

Genitalia (pl. 70, fig. 34 *H. incarnata*) as in *Hygromia* s. str.; penis as usual in the genus; 4 or 5 mucus tubes on each side; dart sack single.

This group is purely conventional, and is retained to contain a series of species distributed by some authors in *Eulota*, *Carthusiana* and *Latonia*. Part of the Fruticicolas have the same anatomical features. See v. Ihering, Morphol. u. Syst. *Helix*, p. 449, and the authorities there cited, for characters the soft parts.

- H. acorta* L. & B.
H. andria Mts., viii, 186.
H. aristata Kryn., iii, 201.
H. bidinensis Caf., iii, 189.
 v. daphnica Platania.
 f. flavida Plat.
H. bifaria West.
H. brigantina Meng., iii, 204.
H. caidis Anc.
H. capusi Villes.
H. carascaloides Bgt., iii, 193.
H. catoleia Bgt.
H. cheffiana Bgt.
H. circassica Mss., iii, 195.
 colchica Bayer.
H. consona Zgl., iii, 188.
 f. panda West.
H. cruzyi Bgt., iii, 198.
H. dasilepida Bgt.
H. densecostulata Ret.
H. euages Bttg., iii, 201.
 f. depressa Bttg.
H. euboica Kob.
H. faidherbiana Bgt., iii, 189.
H. frequens Mouss., iii, 193.
 v. obscura Mouss.
H. freytagi Malz.
H. fruticola Kryn., iii, 200.
 v. bourguignati Pfr.
H. grelloisi Bgt.
H. hausknechti Bttg., iii, 193.
H. hiberna Ben., iii, 188.
H. incarnata Müll., iii, 187.
 sylvestris Hartm.
 rubra Chier.
 f. pallidula Moq., veprium
 [Bgt., silanica Bgt.
v. tecta Zgl., iii, 187.
 obtecta West.
v. monodon Villa, iii, 188.
 armata Stab.
v. welebitana St.
v. byssina Gredl.
 v. juriniana Bgt., iii, 188.
H. inchoata Morel., iii, 200.
H. lenabarica Let.
H. lepidolena Bgt.
H. lurida Zgl.
H. messenica Bl. & W.
 v. acaica West.
H. musicola Bgt.
H. nicaisiana Let.
H. nicosiana Mss., iii, 189.
 f. pallida Mouss.
H. ovularis Bgt.
H. pirajnea Ben., iii, 192.
H. prærupta West.
H. proclivis Mts., viii, 187.
H. pseudosericea Ben., iii, 196.
H. redtenbacheri Zel., iii, 189.
H. rissoana Pfr., iii, 195.
 v. dirphica Blanc., iii, 192.
 v. langei Bgt.
H. rusicadensis Let., viii, 188.
H. schuberti Roth, iii, 195.
 v. frutis Parr.
H. semirugosa Kob., viii, 188.
H. vicina Rm., iii, 188.
 carpatica Friv.
H. villæ Desh., iii, 198.
H. zonitomæa Let., viii, 189.

Section *Fruticicola* Held., 1837 (restricted).

Fruticicola HELD, Isis, 1837, p. 914 (in part).—v. MART., Die Hel., 1860, p. 103, type *H. hispida*. Not *Fruticicola* MacGill.,

1839 (Aves).—"Fruticola" of some writers.—*Bradybæna* BECK, Index Moll. 1837, p. 18. Not *Bradybænus* Dej., 1829 (Coleoptera). —*Trichia* HARTMANN Erd- und Süßwasser-Moll. Schweiz, p. 41 (for *H. hispida*, etc.). Not *Trichia* de HAAN, Fauna Japonica, Crustacea, p. 109 (1840!).

Shell depressed, with convex spire, rounded periphery, and open or narrow umbilicus; brown or greenish, the surface generally hairy. Aperture lunate, slightly oblique, the ends of the thin lip approaching; peristome simple, expanded only at the columellar insertion, and with only a weak internal thickening or none. Type *H. hispida* L., pl. 55, figs. 27, 28.

Jaw delicate, with 10–18 low, riblets. Genital system (pl. 70, fig. 33, *H. hispida*); penis as usual in the genus; mucus glands several; two dart sacks, each with an accessory sack.

Hartmann's name *Trichia* has been used for this group, but its date is uncertain (his book having appeared in parts, from 1840 to 1844), while *Trichia* de Haan is known to bear date 1840. Moreover it seems best to use Held's earlier term *Fruticicola*, which is well known to all malacologists.

The species are very numerous throughout the European area, and several have been imported by commerce into America, etc. A few Chinese species of unknown anatomy are best referred here until their true position can be ascertained.

- | | |
|--|---|
| <i>H. aclerochroa</i> Bgt., iii, 181. | <i>H. clessini</i> Ulic. |
| <i>H. alsia</i> Bgt., iii, 177. | <i>H. corsica</i> Sh., iii, 180. |
| <i>H. becasis</i> Ramb., iii, 176. | <i>H. crispulata</i> Mouss. |
| <i>H. bourniana</i> Bgt. | <i>H. cynetarum</i> Malz. |
| <i>H. cæolata</i> Stud., iii, 175. | <i>H. dieckmanni</i> Mss., iii, 179. |
| <i>v. cœlomphala</i> Loc. | <i>H. dussertiana</i> Bgt., iii, 177. |
| <i>v. vagienna</i> Poll. | <i>H. erjavecii</i> Brus. |
| <i>v. cælatina</i> Loc. | <i>f. mortella</i> , <i>tanora</i> , <i>avarica</i> ,
<i>savinella</i> Serv. |
| <i>H. cedretorum</i> Deb., iii, 179. | <i>H. filicina</i> Schm., iii, 176. |
| <i>H. chnoodia</i> Bgt., iii, 179. | <i>v. nudata</i> West. |
| <i>H. chonomphala</i> Bgt. | <i>H. fusca</i> Mont., iii, 186. |
| <i>ripularum</i> Lessona. | <i>corrugata</i> Gray. |
| <i>H. chrysotricha</i> Bttg., viii, 190. | <i>subrufescens</i> Mill. |
| <i>H. clandestina</i> Hartm., iii, 175. | <i>H. granulata</i> Alder, iii, 178. |
| <i>gratianopolitana</i> Ramb., iii, | <i>globularis</i> Jeffr. |
| <i>v. isarica</i> Loc. | [175.] |

- H. hispida* L., iii, 172.
prevostiana Risso.
 v. *gyrata* West., iii, 173.
 v. *concinna* Jeffr., iii, 173.
 v. *nebulata* Mke.
 v. *septentrionalis* Cl.
 v. *depilata* Ald.
 v. *conica* Jeffr.
 v. *hemisphærica* Less.
 v. *beaudouini* Loc.
 v. *laticensis* Loc.
 v. *morchii* West.
 v. *hispidosa* Mouss., iii, 172.
 v. *nana* Jeffr., iii, 173.
H. kusmici Cless.
H. langsdorffi Mill.
H. lanuginosa Boiss., iii, 180.
flava Terver.
H. lasia Bgt., iii, 179.
H. latiniacensis Loc.
H. martorelli Bgt., iii, 179.
H. matronica Mab.
H. melaspinae Bgt., iii, 180.
H. mendicaria Pfr.
H. mesoleuca Mts.
H. mongrandiana Bgt.
H. montana Stud., iii, 175.
circinnata Stud.
erecta Hartm.
 v. *dubisiana* Cout.
 v. *danubialis* Cless.
H. montivaga West.
salmurina Serv., iii, 181.
H. moquiniana Raym., iii, 181.
f. fradiniana Bgt.
H. multigranosa Mouss., iv, 36.
H. nordenskiöldi W., iii, 201.
rufescens Schrenk.
H. parlatoris Biv., iii, 179.
H. perlevis Sh., iii, 181.
H. plebeia Drap., iii, 174.
f. plebicola Loc.
H. ponsonbyana Pils., viii, 190.
ponsonbyi West. not Kob.
H. psaturochæta Bgt., iii, 182.
H. ptylota Bgt., iii, 181.
H. reinæ Ben., iii, 187.
H. revelata Fér., iii, 180.
ponentina Dup.
martigena Fér.
f. conimbricensis Silv., venetorum Bgt., nevesiana Silv., villula Bgt., platylasia Bgt.
 v. *occidentalis* Recl., iii, 180.
lisbonensis Pfr.
H. roseotincta Fbs.
H. rubiginosa Schm., iii, 178.
 v. *epirotica* Mouss.
H. rufescens Penn., iii, 175.
f. depressa Tayl., minor Jeffr., rubens Moq., albocincta Ckll., alba Moq., manchesteriensis Bgt., brittanica West.
 v. *striolata* C. Pfr.
f. subcarinata Cless.
f. abludens Loc.
 v. *submontana* Mab.
pascali Mab.
 v. *putoni* Cless.
H. saxivaga Malz.
H. sericea Drap., iii, 178.
f. gerstfeldiana Cless., plana Mil., caucasica Mouss., fontainei Colb.
 v. *expansa* Cless.
 v. *corneola* Cless.
 v. *dubia* Cless.
 v. *libertina* West.
 v. *badiella* Zgl., Bgt.
 v. *subbadiella* Bgt.
 v. *subglobosa* Jeffr.

- H. sordulenta* Morel., iii, 177. *H. transsylvanica* Blz.
H. stuxbergi West. *H. umbrosa* Partsch, iii, 176.
 sericea Schrenk. v. *aporata* Bgt.
H. subcæolata Less., iii, 173. v. *umbrosella* Jouss.
 v. *hiaticula* West. v. *sciraia* Bgt.
H. subplebeia Less., iii, 173. v. *oecoscia* Bgt.
H. telonensis Mitt., iii, 186. v. *amella* Bgt.
 f. lavandulæ Bgt., *druentina* *H. urbana* Cout.
 Bgt., *diæga* Bgt., *gelida* *H. vespertina* Morel., iv, 41.
 Bgt., *concreta* Bgt., *crimoda* *H. villersii* Malz., iii, 173.
 Bgt., *pedemontana* Pini, *H. villosa* Stud., iii, 177.
 salassia Poll., *pegorarii* *hispidula* Jan.
 Poll., *segusina* Less., iii, 179. *pilosa* Alten.
 v. *crassilabris* Nev. *f. detrita* Hartm.
 v. *moutoni* Mitt., iii, 186. v. *phorochætia* Bgt.
H. teneitensis Bgt., iii, 180. *H. villosula* Zgl., iii, 176.
 pietruskyana Parr., iii, 176.

Oriental species.

- H. submissa* Dh., iii, 182. *H. puberula* Hde., iii, 183.
H. subechinata Dh., iii, 182. *H. horripilosella* Hde., iii, 183.
H. szechenyii Anc. *H. nautarum* Hde., iii, 183.
H. tchefouensis C. & D., iii, 182. *H. rebellis* Hde., iii, 183.
 munieriana C. & D. *H. barbosella* Hde.

Unfigured and insufficiently known species:—*H. hypsellina* Loc., *steneligma* Bgt., *microgyra* Bgt., *hispidella* Bgt., *deobrigana* Bgt., *ataxiaca* Fag., *vendeana* Let., *bellovacina* Mab., *gosseni* Mab., *elaverana* Bgt., *cavarella* Serv., *duesmensis* Loc., *saporosa* Mab., *astenia* Mab., *ferdinandi* Serv., *bofilliana* Fag., *alphæa* Let., *anasina* Serv., *rosai* Silv., *cularensis* Bgt., *sarinica* Bgt., *tumescens* West., *vendoperanensis* Bgt., *vocontiana* Bgt., *axonana* Mab., *sericella* Serv., *bavariana* West., *aporina* Silva, *ischnia* Mab., *euclastolena* Mab., *berbruggeriana* Loc., *baccueti* Bgt., *challameliana* Bgt., *bastidiana* Bgt., *cotinophila* Bgt., *tæniata* West., *inversa* West., *hierocontina* West., *lentiaca* Sayn (see viii, 190).

Section *Ciliella* Mousson, 1872.

Ciliella MOUSS., Rév. Faun. Mal. Canaries, p. 60 (for *H. ciliata*, *leprosa*, *lanosa*).—*Lepinota* WESTERLUND, Fauna Palaërect. Reg. Binnenconch., *Helix*, 1889, p. 2, 16, type *H. ciliata*. Not *Lepinotus* Heyd., 1850, (Neuroptera).

Shell narrowly umbilicate, subdepressed, keeled or angular at periphery, thin and brownish; surface sculptured with short, scale-like cuticular processes; aperture oblique, oval; outer and basal lips well expanded, somewhat thickened within. Type *H. ciliata* Ven., pl. 55, figs. 22, 23, 24.

Animal having the mantle blotched with black as usual in the genus.

Jaw arched, transparent and yellowish, with numerous, fine, close, regular but not well defined riblets, hardly crenulating the margins (*H. ciliata*). Genital system (pl. 70, fig. 30, *H. ciliata*) with short, stout penis, its retractor terminal and with bifid insertion; epiphallus ending in a short, stumpy flagellum. Duct of spermatheca moderately short, swollen at base. Dart sack and mucous glands wanting.

Distribution, south-central Europe, Canary Islands.

H. ciliata Ven., iii, 187.

folliculata Risso.

hirsuta Jan.

v. *biformis* Beck.

H. guevarriana Bgt.

H. stussineri Bttg.

H. leprosa Shutt., iii, 223.

H. lanosa Mouss., iii, 223.

Section *Metafruticicola* v. Ihering.

Pseudocampylæa HESSE, Jahrb. D. M. Ges. 1884, p. 237, (*q. v.* for anatomy); TRYON, Manual of Conch. (2), iv, p. 114 (part), and of other authors. Not *Pseudocampylæa* Pfeiffer, Mal. Bl., xxiv, p. 8, 1877.—*Cressa* WESTERLUND, Fauna Palaäret. Reg. Binnen-Conch., *Helix*, p. 4, 101, 1889. Not *Cressa* Böck, 1871 (*Amphipoda*).—*Metafruticicola* IHER., Zeitschr. f. Wissensch. Zool. liv, p. 452 (Oct. 4, 1892).

Shell moderately solid, opaque, rather small, depressed-globose, umbilicated, with convex spire of nearly 5 whorls, the first one smooth or costulate, the remainder granulate, grano-costulate or spirally decussated, often with hairs standing in oblique series. Last whorl rounded at periphery, descending in front. Aperture subcircular or oval; peristome sharp-edged, slightly expanded below, strengthened by a strong submarginal internal rib. Type *H. pellita* Fér.

Mantle flecked with dark. Right eye retractor passing between branches of genitalia. Jaw with many (15 to 20) fine vertical riblets (pl. 70, fig. 31, *H. pellita*).

Genitalia (pl. 70, fig. 37, *H. noverca*) ; penis short and stout, continued in a long epiphallus bearing the retractor, and ending in a long flagellum. Spermatheca oval on a moderately long, unbranched duct, which is decidedly swollen or enlarged toward its insertion low on vagina. Dart sack and mucous glands wanting.

The shell has much the aspect of a *Helicigona* of the *cyclolabris* group, but the lip is less expanded and more thickened within, as in *Theba*. The group is doubtless correctly placed by Hesse and v. Ihering, who consider it a Fruticoloid with the dart apparatus lost by degeneration. The jaw and other anatomy as far as known, as well as the structure of the shell, all point to this solution of the simple genitalia. It will be noticed that in *Metafruticicola* the loss of the dart apparatus has left exactly the type of genitalia found in the group Epiphalllogona (*Camæna*, *Chloritis*, *Planispira*, etc.). No jaw of the delicate Fruticicola type has been found in the Epiphalllogona.

Distribution, Grecian Archipelago, most species from Crete.

<i>H. pellita</i> Fér., iv, 115.	<i>H. lecta</i> Fér., viii, 191.
v. <i>kreglingeri</i> Zel.	<i>H. sublecta</i> Malz., iv, 116.
v. <i>graphicotera</i> Bgt.	<i>H. zonella</i> Pfr., iv, 110.
<i>H. testacea</i> Mart., viii, 191.	<i>not the figs. cited.</i>
<i>H. dictæa</i> Mart., viii, 191.	<i>H. medea</i> West., viii, 192.
<i>H. naxiana</i> Fér., iv, 115.	<i>H. giurica</i> Bttg., viii, 192.
<i>H. westerlundi</i> Bl., iv, 115.	<i>H. cerigottana</i> Bttg., Nachr. '94,
<i>H. noverca</i> Friv., iv, 115.	6.

Section *Perforatella* Schlüter, 1838.

Perforatella SCHLÜTER, Syst. Verz., 1838.—*Petasina* MORCH, Catal. Yoldi, 1852, p. 6 (for *edentula* Drap.).

Shell *low-trochoidal*, with rounded-conic raised spire, subangular periphery and small or minute umbilicus. Whorls numerous and *narrowly coiled*. Brownish, often with a light peripheral band. Aperture basal, narrow ; basal lip expanded, *thickened within by a very strong callus, which is usually more or less truncate or 1-toothed*. Type *H. unidentata* Drap.

Jaw thin, horn-colored, with 18–25 riblets (*leucozona*). Genitalia (pl. 70, fig. 36, *H. leucozona*) as in typical *Fruticicola*. The mucus

glands are inserted very high, four on each side; some distance below them are two dart sacks, with two accessory sacks, the latter containing no darts. Penis, etc., as usual in the genus. The genital system of *H. unidentata* is the same as in *leucozona*.

A group of Middle Europe, in which the shell has much similarity to *Dibothrion*, but the genitalia are as in *Fruticicola hispida*, etc.

- | | |
|---------------------------------------|---------------------------------------|
| <i>H. unidentata</i> Drap., iii, 171. | <i>H. leucozona</i> Zgl., iii, 171. |
| <i>cobresiana</i> Alt., iii, 171. | <i>coadunata</i> Z. |
| <i>monodon</i> Fér. | <i>f. delopida</i> Jan. |
| <i>ville</i> Mühlf. | <i>f. crassilabris</i> Mühlf. |
| <i>ventricosa</i> Jan. | <i>f. rutilans</i> Z. |
| <i>f. anodonta</i> Tschap. | <i>modesta</i> Parr. |
| <i>f. alpestris</i> Cl. | <i>v. ovirensis</i> Rm., iii, 172. |
| <i>f. subleucozona</i> Fag. | <i>v. heteromorpha</i> W., iii, 172. |
| <i>H. edentula</i> Drap., iii, 171. | <i>v. erjavecii</i> Cless., iii, 172. |
| <i>depilata</i> Drap. | <i>H. bielzi</i> Schm. |
| <i>liminifera</i> Held. | <i>v. bosnensis</i> Mildff. |

Section *Dibothrion* Pfr., 1855.

Petasia BECK, Index, 1837, p. 21. MARTENS, Die Hel., 1860, p. 102, type *H. bidens*. Not *Petasia* Serv., 1821 (Orthoptera) of Steph., 1829, (Lepidoptera) or of Morr. 1829, (Polyzoa).—*Trochiscus* HELD, Isis, 1837, p. 915. Not *Trochiscus* Heyden 1826, (Arachnida).—*Dibothrion* PFR., Mal. Bl. 1855, p. 128 (for *bidens* and *bicallosa*).

Shell subtrochoidal, with convex-subconic spire of numerous narrow whorls, and closed or nearly closed umbilicus; arcuate-striate, translucent brown with light peripheral band. Aperture basal, narrow; lip well expanded, reflexed, with two strong internal teeth or nodules on the basal margin, marked by pits behind the lip; parietal wall toothless. Type *H. bidens*, pl. 55, figs. 25, 26.

Genitalia (pl. 70, fig. 41, *H. bidens*): Dart sack single, cylindrical and rather large; two mucus glands on each side. Other organs as in *Hygromia* generally, except that the spermatheca duct is unusually short. Dart needle-like, with four short blades at the point.

Distribution, eastern Europe and Siberia.

- H. bidens Chemn., iii, 170. H. bicallosa Friv., iii, 171.
 bidentata Gm.
 v. diodon Parr., iii, 171.
 dibothrion Friv.

Section *Metodontia* Möllendorff, 1886.

Metodontia MLLDFF., Jahrb. D. M. Ges., 1886, p. 191, type *H. hemipleuris*.—*Tetrodontina* ANCEY, Conch. Exch. i, p. 64, May, 1887.—See HILBER, Sitzungsber. k. Akad. Wissensch., lxxxvi, pl. 1, f. 1-3, development of aperture armature.

Shell perforate, globose-turbinate or subdepressed, brown or whitish; whorls numerous and narrow, the last not descending in front. Aperture lunate, nearly closed by two large lip teeth usually situated on a ridge of callus, opposed to two smaller teeth on the parietal wall. Lip thin-edged, expanded below, reflexed at columellar insertion. Type *H. hemipleuris* Mlldff.

Anatomy unknown. The group seems most nearly allied to *Dibothrion* of the Eur.-Asian fauna. It has nothing to do with the American group *Triodopsis*.

The group is confined to the dry northern half of China, being about coextensive with the Löss formation.

- H. hemipleuris Möll., iii, 149. H. houaiensis Cr., iii, 149.
 moltneri Gredl. *obstructa* Hde. not Fér.
 H. yantaiensis C. & D., iii, 149.
 v. tetrodon Möll., iii, 149.

Genus AULACOSPIRA Möllendorff, 1890.

Aulacospira MLLDFF., Bericht über die Senckenbergische naturforschende Gesellschaft in Frankfurt a. M., 1890, p. 224.—*Micropetasus* MLLDFF., l. c.

Shell small, umbilicate, of thin corneous structure; unicolorous, pale brown. Spire more or less raised, from the beginning sub-scalar and keeled; whorls 4 to 5, striatulate, flattened or with spiral concavity, the last whorl keeled or rounded. Aperture oblique, generally subcircular, with 0 to 5 teeth a short distance within; peristome thin, reflexed. Type *A. scalatella* Mlldff., pl. 64, figs. 10, 11, 12.

Anatomy unknown. The species live in clefts and crevices of limestone rocks, in which the flatness of their shells allows them ready access, and like *Vallonia* they seem to be gregarious. The species now known are from Cebu, Busuanga, Luzon and the Island Ilin, near Mindoro; but it probably will prove to have many more species in other islands of the Philippine group.

In deference to the opinion of Möllendorff I give the group place here in the vicinity of *Fruticicola*; but my own course would be to place it next to *Eulota* or even as a subgenus within that genus. Compare the similar group *Platypetanus* (p. 207). I am now disposed to consider *Pupisoma* (see p. 52), as well as *Aulacospira*, as branches of the *Eulota* stock, *parallel to*, rather than *allied to* *Acanthinula* and *Vallonia* which seem to be early branches of the *Hygromia* phylum. They will probably be found to have the genitalia considerably simplified by suppression of accessory organs, and the marginal teeth multicuspid; these changes usually accompanying such great reduction in the size of snails.

Möllendorff establishes two sections:

Aulacospira s. str. (of which *Micropetanus* is an absolute synonym).
Keel extending to aperture; peristome continuous and free.

Pseudostreptaxis Mlldff. (*l. c.* p. 225). Penultimate whorl distinctly deviating; the last whorl not keeled, cylindrical; aperture 5-toothed, the peristome not continuous. One species *A. azpeitia*.

- *
A. hololoma Mlldff., viii, 198. *A. porrecta* Quadr. & Mlldff.,
A. mucronata Mlldff., viii, 198. Nachrbl. 1894, p. 95.
A. scalatella Mlldff., viii, 199. *A. azpeitia* Hid., viii, 199.

Genus ACANTHINULA Beck, 1846.

Acanthinula BECK, Amtl. Ber. Vers. Kiel, 1846, p. 122.—v. MART. in Die Hel., 1860, p. 100.—*Euacanthinula* WEST., Fauna, p. 16.

Shell minute, pyramidal or globosely-turbinate, thin, brown, minutely umbilicated. Epidermis raised into lamellæ crossing the whorls. Aperture subvertical, semilunar or subcircular, the lip acute, expanded toward columellar insertion, the margins remote. Type *A. aculeata* Müll., pl. 70, figs. 26, 27, 28.

Animal apparently with even, not crenulated foot-margins; oviparous? Jaw arched, with numerous flat ribs. Genitalia (pl. 63,

fig. 11, *A. lamellata*, after Lehmann) apparently lacking mucus glands, but dart sack present.

Distribution, Palearctic and Nearctic regions, mainly northward.

The genitalia are very imperfectly known, the figure in Lehmann's posthumous work representing *A. aculeata* being very much like a *Buliminus* or *Pupa*, and possibly, as v. Ihering suspects, inserted through some confusion of drawings. A new investigation is urgently required. Possibly the group does not belong to the Helicidae. *A. lamellata* and *aculeata* have been found in Pliocene deposits; and in the lower Miocene of middle Europe the genus is represented by several species, *A. nana* A. Braun, *paludiformis* Br., *tuchoricensis* Klika, *plicatella* Reuss.

- | | |
|------------------------------------|---------------------------------------|
| <i>A. aculeata</i> Müll., iii, 53. | <i>A. lamellata</i> Jeffr., iii, 54. |
| <i>spinulosa</i> Lightf. | <i>scarburgensis</i> Alder. |
| <i>granatelli</i> Biv. | <i>seminulum</i> Rossm. |
| <i>delectabilis</i> Sol. | <i>A. peracanthoda</i> Bgt., iii, 54. |
| <i>f. albida</i> Jeffr., iii, 53. | <i>raffrayi</i> Bgt. not Canef. |
| <i>albina</i> West. | <i>raffrayana</i> Ckll. |
| v. <i>sublævis</i> West., iii, 54. | <i>A. spinifera</i> Mouss., iii, 54. |
| <i>A. spermatia</i> Silva. | <i>A. monas</i> Morel., iii, 54. |
| <i>A. harpula</i> Reinh. | |

Section *Zoögenites* Morse, 1864.

Zoögenites MORSE, Terr. Pulm. Maine, p. 32, pl. 1.

Shell globose-turbinate, perforate, ornamented with oblique cuticular lamellæ. Type *Z. harpa* Say, pl. 70, figs. 23, 24, 25.

Animal with the foot-edges prominently crenulated; labial lobes large; lower tentacles nearly obsolete; viviparous, the young at birth as large as the aperture of the shell. Jaw (pl. 70, fig. 35) having numerous wide subobsolete ribs. Radula with formula 11.6.1.6.11. Middle teeth tricuspid, the mesocone not reaching edge of the square basal plate. Laterals bicuspid. Marginals wide, with many irregular cusps. Genitalia unknown.

A. harpa Say, iii, 54. New England, British America, Sweden, Kamtchatka, etc.

Syn.: *P. costulata* Mich., *H. amurensis* Gerst.

Genus VALLONIA Risso, 1826.

Vallonia RISSO, Hist. Nat. Eur. Mérid. iv, p. 101, sole species *V. rosalia*.—*Zurama* LEACH in Turton's Man. L. and Frw. Sh. Brit. Is., p. 64, 1831.—*Amplexus* BROWN, Ill. Conch. G. B. 1827; Edit. 1844, p. 45.—*Chilostoma* FITZ., in part, 1833.—*Circinaria* BECK, Index (in part), p. 23.—*Glaphyra* ALB., Die Hel., 1850, p. 87 (in part).—*Lucena* MOQ.-TAND., Moll. Fr. ii, p. 140, not Oken.—See STERKI, Proc. Acad. Nat. Sci., Phila., 1893, p. 234 (monograph of genus, jaws and dentition).—ASHFORD, Journ. of Conch. iv, p. 198 (dart).—LEHMANN, Die lebenden Schnecken u. Muscheln Stettins u. Pommern, p. 90, pl. 11, f. 30 (genitalia, etc.).

Shell *minute, openly and widely umbilicate, depressed*, the spire low-convex, consisting of 3-4½ whorls, color light and uniform; surface smooth or ribbed; periphery rounded; last whorl usually descending in front. Aperture oblique, circular or short-oval; *peristome continuous or nearly so, expanded or reflexed*, often thickened within. Type *V. pulchella* Müll., pl. 55, figs. 31, 32.

Foot small, short, with no pedal grooves; edges of sole somewhat crenulated; sole undivided; eye-peduncles cylindrical, not enlarged distally; tentacles short; labial lobes well developed.

Jaw arcuate, with a slight median projection or none, sculptured with numerous (18 to 25) crowded, low riblets, denticulating the margins (pl. 70, fig. 29, *V. pulchella*).

Radula having 23 to 33 teeth in a transverse row. *Median teeth decidedly narrower than laterals*, tricuspid, the *mesocone not half as long as basal-plate*, side cusps smaller. Laterals with large square basal plates, the mesocone extending to its edge, ectocone small. Marginal teeth wide and low, multicuspid (pl. 70, fig. 38 *V. pulchella*).

Genitalia (pl. 63, figs. 9, 10, *V. pulchella*, after Lehmann) having the penis short, with terminal retractor; epiphallus short, bearing a flagellum. Dart sack present, single, containing a straight, bladeless dart (fig. 10, x 100). No mucus glands. Duct of spermatheca long, branchless.

Distribution, North America South to Texas; Japan and middle China to Europe and Atlantic Islands. Fossil the group is known from the lower Eocene (*V. sparnacensis* Dh.); and in the Miocene several species, *lepida* Reuss., *subpulchella* Sandb., occur.

This very distinct genus of minute snails occupies the entire Nearctic and Palearctic regions, and some species have been introduced (probably with plants) into Australia, Mauritius, etc. They are gregarious in habit, and live under fragments of wood, stones, on mossy cliffs and in damp meadows, always avoiding light. The number of species is very uncertain; but whether species or varieties, there can be no doubt that a considerable number of recognizable forms must be distinguished. The arrangement given below is that of Dr. Sterki, who has made special studies on a far greater mass of material than any other observer. An alternative to this classification would be to make *excentrica* a variety of *pulchella*, and unite *adela*, *declivis* and *pollinensis* under the former of the three names; all the forms of the *costata* group might then fall under *costata* as varieties. Having seen neither *mionecton*, *ladacensis* nor *asiatica* I do not care to suggest any mode of uniting the forms included in Sterki's "Group of *V. cyclophorella*."

Group of V. pulchella.

- | | |
|--------------------------------|----------------------------------|
| V. pulchella Müll., viii, 248. | v. enniensis Gredl. |
| <i>rosalia</i> Risso (part). | v. hispanica Sterki. |
| <i>paludosa</i> Da Costa. | v. persica Rosen. |
| <i>crystallina</i> Dillw. | V. excentrica Sterki, viii, 249. |
| <i>levigata</i> Moq. | V. adela West., viii, 251. |
| <i>nitidula</i> Stud. | V. declivis Sterki, viii, 251. |
| <i>potua</i> Chier. | v. altilis Sterki. |
| <i>minuta</i> Say. | V. pollinensis Paul., viii, 252. |

Group of V. costata.

- | | |
|------------------------------|------------------------------------|
| V. costata Müll., viii, 252. | V. albula Sterki. |
| <i>alexandrae</i> Cox. | V. parvula Sterki, viii, 254. |
| <i>rosalia</i> Risso (pt.). | V. tenera Reinh., viii, 255. |
| <i>crenella</i> Mont. | <i>pulchellula</i> Hde. |
| <i>helicinus</i> Lightf. | v. patens Reinh., viii, 257. |
| v. helvetica Sterki. | V. gracilicosta Reinh., viii, 256. |
| v. amurensis Sterki. | |
| v. pyrenaica Sterki. | |
| v. montana Sterki. | |

Group of V. cyclophorella.

- V. cyclophorella* Anc., viii, 259. *V. mionecton* Bttg., viii, 260.
V. perspectiva Sterki, viii, 257. v. *schamhalensis* Rosen.
V. tenuilabris Br., viii, 258. *V. ladacensis* Nev., viii, 260.
v. *saxoniana* Sterki, viii, 259. v. *asiatica* Nev., viii, 260.

Genus *HELICODONTA* Férussac, 1819.

Helicodonta FER. Tabl. Syst. de la Fam. des Limaçons, p. 33 (in part).—RISSE Hist. Nat. de l'Eur. Mérid., iv, p. 65, 1826 (restricted to *H. obvoluta*).—*Trigonostoma* FITZINGER, Syst. Verzeich., 1833, p. 97, species *H. holosericeum*, *H. obvolutum*. Not *Trigonostoma* Blainv., 1825, *Cancellariidæ*.—*Vortex* BECK, Index Moll., 1837, p. 29.—*Gonostoma* HELD, Isis, 1837, p. 915 (preoccupied by Rafinesque in Pisces, 1810.)—*Anchistoma* ("Klein," preLinnaean) H. & A. ADAMS, Gen. Rec. Moll. ii, p. 205, 1855 (subg. *Polygyra* and *Drepanostoma* only, the former in part).—*Euphemia* LEACH, teste BECK, Amtl. Ber. v. Kiel, 1846, p. 122.—? *Plicostoma* SCHLUTER, Verz. p. 4, 1838, s.-g. *Helix*, for *H. intestinalis* Schlüt. (publication not seen by H. P.).—*Chilodon* and *Helicodon* EHRENB. Symb. Phys., 1831.

Drepanostoma PORRO, Mag. de Zool., 1836, classe v, pl. 71, type *D. nautiliformis*.—*Contorta* MEG. de MUHLF., test. VILLA, Disp. Syst. Conch. Coll. Villa, p. 19, 1841.

Caracollina BECK, Index Moll., p. 28, 1837.—LOWE, P. Z. S., 1854, p. 196, type *H. barbula* Charp.—And probably *Caracollina* EHRENBURG, Symb. Phys. Evert., Moll., no diagnosis; no species mentioned.—*Caracolina* auct.

Aspasita WESTERLUND, Fauna der in der Paläarctischen Region Lebenden Binnenconchyl., *Helix*, pp. 18, 26, type *H. triaria*.

See for anatomy, A. Schmidt, Stylommatophoren p. 34, pl. 8. Moq.-Tand, Hist. Nat. Moll. France, p. 109–114, pl. 10.—Hesse, Jahrb. d. d. Malak. Ges. xi, 1884, p. 233, pl. 4, f. 5.—St. Simon, Journ. de Conch., 1867, p. 98.—Schuberth, Archiv f. Naturg., 1892, p. 5, pl. 1.—v. Ihering, Morphol. u. Syst., p. 475.

Shell *depressed*, usually *umbilicated*, rather thin, never cretaceous; *unicolored brown*; striate, granulate, ribbed or hairy. Spire *low*, consisting of numerous closely coiled whorls. Aperture *triangular*, rhombic or *lunate*, the lip-ends remote; *peristome expanded and reflexed*, lipped, often toothed. Type *H. obvoluta*, pl. 56, figs. 25,

26, 27 (see also pl. 56, figs. 16, 17, *H. constricta*; figs. 18, 19, *H. lens*; figs. 23, 24, *H. triaria*; figs. 28, 29, 30, *H. biconcava*; figs. 31, 32, 33, *H. nautiliformis*).

Animal rather elongated, with long, narrow foot, the sole undivided; back with a pair of longitudinal grooves; facial grooves wanting. Mantle with a small right body-lappet; no left one. Right eye-retractor passing between branches of genital system. Epiphragm papery, flat, formed rather deep in the mouth.

Jaw thin and flexible, with numerous (6 to 16) broad, flat ribs, separated by narrow interstices (pl. 36, fig. 6, *H. lenticula*; pl. 36, fig. 8, *H. maroccana*).

Radula having the mesocones slightly longer than the basal plates, ectocones small. Marginal teeth having the ento- and mesocones united at base, ectocone developed (pl. 36, fig. 5, *H. lenticula*. Pl. 36, fig. 7, *H. maroccana*).

Genital system: penis long, the retractor median or terminal, *inserted distally on columellar muscle*; *no flagellum*. Vagina long, bearing from one to three cylindrical elongated mucus glands, with one dart sack at or below their base, sometimes lacking; the dart, when present, short and conical (pl. 36, fig. 9, *H. lusitanica*). Spermatheca oval, its duct short, bound to the uterus and without diverticulum. See pl. 36, fig. 4, *H. obvoluta*; pl. 36, fig. 10, *H. lusitanica*.

The number of mucus glands varies from one to three. *H. obvoluta* has one long and one very short gland. The dart sack is entirely absent in some species. The dentition is of the type usually developed in ground snails. The jaw is uncommonly delicate for the ribbed type. The union of the penis retractor muscle with the great columellar retractor is a peculiar feature, and it will be interesting to find whether it holds throughout the genus. I have observed it in *H. obvoluta* only.

The brownish, unicolored shell, with depressed spire, slowly widening narrow whorls and reflexed, lipped peristome, is very characteristic; and no shells of the Palearctic fauna, except *Isognomostoma* and *Dibothrion* can be compared with this genus—these two groups also having toothed apertures, but sufficiently different in form from those of *Helicodonta*.

Von Ihering maintains, I believe with right, that this genus is more nearly allied to *Fruticicola* than to *Helix* or *Campylæa*, differ-

ing mainly in the reflexed, lipped peristome, and more or less degenerate dart apparatus. *Helicodonta* is not in the least allied to the American or Indian toothed *Helices*, or to the so-called *Gonostoma* of California.

The circum-Mediterranean region is the headquarters of this genus, although a few forms occupy central Europe, and one, *obvoluta*, has obtained a foothold in southern England. In south-east Asia it reappears in a number of specific forms comparable to the European species *obvoluta* and *diodonta*, but not readily falling into the sectional groups established for European forms. The Canary Islands are nearly the westward outpost of the genus, one species only occurring in Madeira.

The name *Helicodonta* was originally proposed for all toothed *Helices*; but was restricted by Risso, in 1826, to *H. obvoluta*. As no other name for the group appeared before 1833, there is no question as to the propriety of reverting to this one, especially since the names in common use, *Gonostoma* and *Trigonostoma* are preoccupied, and must, in any case, be rejected. Besides two species still retained in this group, Férussac included in *Helicodonta* members of the prior genera *Polygyra*, *Pleurodonte*, *Cepolis*, and *Anostoma*, as well as of the later groups *Strobila*, *Corilla* and *Petasia*. The term *Anchistoma* of the Adam's brothers (1855) has been used for *Helicodonta* by Kobelt and others. It has been attributed to Klein (1753), but his "*Angystoma*" contains none of the European toothed *Helices* and, in any case, the genera and species of the *Tentamen methodi Ostracologicæ* are not of Linnæan form, and antedate the Linnæan era. Ehrenberg's contribution to the taxonomy of this group is of little value. He divides the land snails into two series, based on the absence or presence of aperture-teeth: *Chilogymnus* containing *Helix*, *Caracolla*, *Bulimus*, *Pupa*, and *Chilodon* containing *Helicodon*, *Caracollina*, *Bulimina*, *Pupina*. The genera of *Chilodon* are all new, although he does not so state; but, as they are nude names, without a word of diagnosis except what may be tacitly gathered from the above arrangement, and as no species of any of them are mentioned, their bearing on nomenclature is *nil*, and none of them can be dated from 1831, or adopted at all except when defined by later authors. The group *Vortex* of Oken (1815) contained depressed *Helices* and *Zonitids* of many groups, and, as it is a composite group, and the name was not used in especial connection with *Helicodonta* until after the publications of Férussac and

Risso, it has no claim for adoption, and had better be dropped entirely.

Key to Sections of Helicodonta.

- a. Spire deeply sunken, narrower than umbilicus; aperture narrow-crescentic, lip simple and retracted above, expanded and lipped outwardly and below. Nautilus-shaped, *Drepanostoma*.
- aa. Spire wide, nearly level or convex.
 - b. Aperture triangular or square, lip teeth 2 or obsolete, periphery rounded.
 - c. Not ribbed; last whorl wider than preceding; spire nearly level, *Helicodonta* s. s.
 - cc. Small, ribbed above, last whorl narrow as preceding; spire convex, *Aspasita*.
 - bb. Aperture lunate or rhombic; shell much depressed.
 - c. Outer edge of parietal callus raised into an erect barrier, *Trissexodon*.
 - cc. Parietal callus thin, wholly adnate, *Caracollina*.
 - bbb. Aperture lunate, toothless; shell sub-globose, *Klikia*.

Species.

DREPANOSTOMA Porro. Nautiloid, biconcave, with crescentic mouth.

H. nautiliformis Porro., iii, 114. Lombardy.
drepanostoma Bk.

HELICODONTA (Fér.) Risso. Species of middle Europe.

- | | |
|--|---|
| <i>H. angigyra</i> Zgl. Rm., iii, 115. | <i>H. obvoluta</i> . |
| <i>stentzii</i> Partsch | <i>f. pallida</i> M.-T. |
| <i>H. obvoluta</i> Müll., iii, 115. | v. <i>bosniaca</i> Bttg., iii, 115. |
| <i>trigonophora</i> Lam. | v. <i>blanci</i> Poll., viii, 150. |
| <i>bilabiata</i> Oliv. | <i>H. holoserica</i> Stud., iii, 116. |
| <i>holosericea</i> Gmel. | <i>diodontostoma</i> Bgt. |
| <i>f. dentata</i> Held. | v. <i>pluridentata</i> Poll., iii, 116. |
| <i>f. edentata</i> West. | <i>H. diodonta</i> Mühlf., iii, 116. |

Chinese species of Helicodonta.

- | | |
|--|--|
| <i>H. subobvoluta</i> Anc. J. B., xi, 308. | <i>H. diplomphala</i> Möll., iii, 124. |
| <i>H. molina</i> Hde. | <i>H. uninodata</i> Gred., viii, 150. |
| <i>H. biconcava</i> Hde., iii, 117. | <i>H. binodata</i> Müllf., iii, 124. |
| <i>outangensis</i> Crosse. | ? <i>bicallosula</i> Hde. |

<i>H. parryi</i> Pons. & Sykes.	<i>H. everia</i> Mab., iii, 123.
<i>H. afficta</i> Fér., iii, 122.	<i>H. marcida</i> Sh., iii, 123.
<i>H. planaria</i> Mouss., iii, 122.	<i>H. crispolanata</i> Woll., iii, 123.
<i>H. discobolus</i> Sh., iii, 123.	<i>H. beata</i> Woll., iii, 123.
<i>H. fortunata</i> Sh., iii, 123,	<i>H. gomeræ</i> Woll., 123.
<i>H. pthonera</i> Mab., iii, 123.	<i>H. eutropis</i> Shutt. iv., 36.

Section *Klikia* Pilsbry, 1894.

Shell depressed-globose, narrowly umbilicated, with convex, obtuse spire and round periphery. Surface costulate-striate and minutely papillose in regular diamond pattern. Last whorl constricted behind the lip, which is well reflexed and thickened. Type *H. osculum* Thomae, pl. 71, fig. 49.

This apparently extinct type of *Helicodonta* is characteristic of middle European Miocene, where it coexisted with species of *Caracollina*, such as *phacodes* Thomae, and with species of typical *Helicodonta*; *H. involuta* Thomae being allied to the recent *angigyra* and *biconcava*. The strong differentiation of these sectional groups at as early a period as the lower Miocene (when they were, in fact, as strongly differentiated as in the recent fauna), argues a vastly greater antiquity for the genus as a whole. This group is named in honor of Gottlieb Klika, author of an excellent memoir upon tertiary land and fresh-water shells of Bohemia.

Subgenus MOELLENDORFFIA Ancey, 1887.

Möllendorfia ANC., Conch. Exch., May, 1887, p. 64.—PILSBRY, Man. Conch., vi, p. 10.—*Proctostoma* MABILLE, Bull. Soc. Mal. de France, iv, p. 102, 103, 104, 1887 (for *H. loxotatum*).—*Polygyra* and *Cepolis* of some authors.—*Trihelix* ANC., t. c., p. 64 (for *H. horrida*).

Shell depressed, with *low-convex, flat or concave spire of $4\frac{1}{2}$ – $5\frac{1}{2}$ whorls*, rounded or keeled periphery, and convex, umbilicated base. Surface more or less granular, tubercular or hairy, uniform brown, dull and opaque. Apical whorl rather large; *last whorl deeply deflexed in front, with deep pits or grooves behind the lip*. Aperture very oblique or subhorizontal, trigonal or squarish, the *lip expanded and reflexed, continuous across the parietal margin*, sometimes solute; *basal lip armed with a stout tooth, outer lip with one or two large entering folds*. Type *H. trisinuata* Martens (see pl. 40, figs. 16, 17, 18, *H. hensaniensis* Gredl.; pl. 56, figs. 20, 21, 22, *H. erdmanni* Schmäcker & Boettger).

Anatomy unknown. Distribution, southeastern China, Tonquin and Cambodia.

Among Old World *Helices* this peculiar group can only be compared with the typical *Helicodontas* (*obvoluta*, *holoserica*, *diodonta*, etc.) of Europe and China. From these, *Möllendorffia* differs in the fewer whorls, continuous peristome, etc. Still, I find no differences of generic value in the shells; and, unless the anatomical features prove peculiar, we can hardly accord the group higher rank than subgeneric. In America, we find analogical shell structures in *Pleurodonte* (*Labyrinthus*) *leucodon* and its allies, which somewhat resemble *H. trisinuata*; and *H. horrida* may be compared with *Epiphragmophora* (*Averellia*) *macneilli* Crosse; but these are merely adventitious resemblances, due to the action of mechanical causes, which have produced tridentism in many diverse groups of *Helices*,

<i>H. loxotatum</i> Mab., vi, 13.	<i>H. erdmanii</i> Schm. & Bttg.
<i>H. trisinuata</i> Mart., vi, 11.	Proc. Mal. Soc. Lond., i, pl. 9.
v. <i>sculptilis</i> Möll., vi, 12.	<i>H. faberiana</i> Möll., vi, 10.
<i>H. eastlakeana</i> Möll., vi, 12.	<i>H. biscalpta</i> Hde., vi. 9.
<i>H. hensaniensis</i> Gredl., vi, 299.	<i>H. horrida</i> Pfr., vi, 9.

Genus ALLOGNATHUS Pilsbry, 1888.

Allognathus PILSB., Man. Conch. (2), iv, pp. 121, 149, type *H. grateloupi*.—KOBELT Nachrbl. D. M. Ges., 1891, p. 140.—Cf. SCHUBERTH, Archiv f. Naturg., lviii, 1892, pp. 38, 61, pl. 4, f. 10, 11 (anatomy).

Shell globose, thin, smooth, imperforate, with low spire of about $4\frac{1}{2}$ whorls and obtuse apex; last whorl descending in front, pale, with five spotted bands. Aperture round-lunate, oblique; lip expanded, in the middle of the base closely appressed, the columellar margin arcuate and rather wide. Type *H. gracilsiana* Pfr., pl. 43, figs. 39, 40.

Jaw arcuate with a median projection, *its surface entirely smooth*.

Radula very large (length 7, breadth 4 mill.). *Teeth all of the same form, strap-shaped*, bent in a half circle, the cusp single, simple and blunt (pl. 36, fig. 2, teeth from above, fig. 3, profile of cusps). Outer teeth similar but somewhat smaller.

Genital system resembling that of *Helix* but the sacculated uterus extends far downward; the spermatheca duct is swollen

below, and bears in the middle a diverticulum 27 mill. long, not bound to the uterus. Dart-sack large (6 mill. long), containing a four-bladed dart with expanded funnel-shaped crown; above the sack are inserted two mucus-glands, each split into two large, club-shaped fingers. Penis 16 mill. long, cylindrical, the retractor muscle terminal; flagellum 37 mill. long (pl. 36, fig. 1, *A. graellsiana* Pfr.).

This genus is founded upon a single species inhabiting the Balearic Islands. The shell furnishes no characters of more than specific value, separating it from such species of *Otala* as *beaumieri*, etc.; and it is by no means impossible that this and some other species, such as *H. quedenfeldti* Mts., may prove to belong to *Allognathus*. Notwithstanding this similarity of shell, we find in the anatomy profound differences from all other Pentatæniate Helices. The jaw is smooth, as in *Leucochroa*; the teeth are very aberrant in the narrow basal-plates which curve over into a blunt, strap-like cusp, entirely lacking side cusps, and they are alike over the whole radula. The genital system presents a resemblance to *Campylea* in the two-fingered mucous glands, but is otherwise more like the Pentatæniate groups. We are disposed to consider *Allognathus* a special modification of the *Helix* stock, comparable to the *Polymita* off-shoot from *Hemitrochus*.

A. graellsiana Pfr., iv, 150.

grateloupi Graells not Pfr. *tessellata* Fér., not Mühlf.

Genus LEPTAXIS Lowe, 1852.

Leptaxis LOWE, Ann. Mag. N. H. (2), ix, p. 164, Feb., 1852; P. Z. S. 1854, p. 164, type *H. erubescens* Lwe.—*Katostoma* LWE., P. S. S. 1854, p. 166, type *H. phlebobphora* Lwe.—*Macularia* sp. LWE., t. c., p. 166.—*Cryptaxis* LWE., t. c, p. 168, type *H. undata* Lwe.—*Campylea* sp. LOWE.—*Pseudocampylea* PFR., Mal. Bl. 1877, p. 8; Nomencl. Hel. Viv. 1878, p. 162, types *lowei* and *portosantana*.—*Lampadia* Alb. MSS., LWE., P. Z. S. 1854, p. 197, type *H. webbiana* Lwe. (Not "Lampadie," Montf., French vernacular name for *Lampas* Montf.).—*Mitra* ALB., Die Hel. 1850, p. 115, type *H. webbiana*; (not *Mitra* Lamarck.)

Shell of moderate or large size, globose, globose-depressed or lens-shaped and keeled, imperforate (rarely umbilicate), the surface striate, plicate, granulated or malleated; rather thin; uniform

brown, banded or maculated. Whorls 5 to 6, the last wide, deflexed in front. Aperture transverse-oval, oblique, the outer lip simple or expanded, columella usually widened. Type *H. erubescens* Lowe. (See pl. 43, fig. 41, *L. undata*; fig. 36, *L. lowei*; fig. 45, *L. webbiana*).

Jaw (pl. 67, fig. 20 *L. undata*) well arched, strong, bearing very widely unequally separated linear riblets, converging below, forming median triangle.

Radula (pl. 67, fig. 19, *L. undata*) having the cusps of median teeth about as long as basal plate, side-cusps obsolete; basal plate with a backward-projecting tongue-like process. Lateral teeth with a stout ectocone. Marginals having the inner cusp shorter than usual and obtusely bifid, outer cusp simple.

Genital system (Frontispiece, figs. 8, 9, *L. undata*) having the penis continued in an epiphallus which bears the retractor and ends in a short flagellum and the vas deferens. Dart sack large, seated on atrium. Mucus glands in two clusters, one composed of 5, the other of about 10 tubes, which adhere laterally by twos or form larger palmate groups (fig. 8, d. s. turned downward and groups of mucus glands spread). *Spermatheca* very large, rather boot-shaped, with a basal cœcum embedded in uterus; duct long and without diverticulum. The penis-retractor is inserted distally on the lung floor, and the right eye-retractor passes between branches of genitalia. Dart of large size, a little curved, with a lateral expansion on each side. *Spermatheca* contained a rod-like chitinous spermatophore, star-like in section.

The jaw of *L. undata* is peculiar and unlike that of any allied form, resembling most the jaw of *Plectopylis*. The teeth are characterized by the strong development of ectocones on the inner laterals. The genital system is remarkable for the unusual size and shape of the spermatheca which lacks diverticulum unless it be represented by the basal sack figured. The mucus glands are in two groups, and inserted on the vagina as usual in *Helix*, but the individual tubes adhere laterally in a way I have not observed in other forms. They are not bound together like those of *Eulota*, however. The dart had unfortunately been expelled from the individuals examined, but has been described by Mörch (Journ. de Conch. 1865, p. 390).

I had expected to find in *Leptaxis* some archaic characters preserved; for its geographic position and the shell-peculiarities argue

for the group an ancient origin; but the evidence shows that however remote in the past the type was derived from the continental fauna, the main anatomical features of modern European *Helices* were then well established. If the genetic relationship of *Leptaxis* with Oligocene forms of middle Europe claimed by Sandberger and others be admitted (and this we have no good reason for doubting), then by implication those fossil forms were anatomically very like the modern European *Helices*.

It is a noteworthy fact that in no anatomical feature, whatever, does *Leptaxis* approach the West Indian groups of *Helices*. They have diverged from different stocks, and since Mesozoic time along widely separated paths both geographically and structurally.

Distribution, Madeira, Azores and Cape Verde groups.

(*Shell depressed, with open umbilicus and expanded peristome.*

PSEUDOCAMPYLÆA. *Porto Santo.*)

L. portosanctana Sowb., iv, 199. *L. lowei* Fér., iv, 200.

(*Shell imperforate.* LEPTAXIS. *Madeira species.*)

- | | |
|--------------------------------------|--------------------------------------|
| <i>L. undata</i> Lwe., iv, 189. | <i>L. psammophora</i> Lwe., iv, 191. |
| <i>corrugata</i> Sol. ms. | <i>L. wollastoni</i> Lwe., iv, 199. |
| <i>groviana</i> Fér. | v. <i>forensis</i> Woll., iv, 199. |
| <i>scabra</i> Wood. | <i>L. chrysomela</i> Pfr., iv, 198. |
| <i>L. vulcanica</i> Lwe., iv, 190. | <i>ænostoma</i> Lwe. not Fér. |
| <i>L. leonina</i> Lwe., iv, 190. | v. <i>fluctuosa</i> Lwe., iv, 198. |
| <i>L. nivosa</i> Sowb., iv, 190. | <i>L. erubescens</i> Lwe., iv, 191. |
| <i>exalbida</i> Wood. | <i>simia</i> Fér. |
| <i>decolorata</i> Lwe. | v. <i>portosancti</i> Woll. |
| v. <i>phlebophora</i> Lwe. | v. <i>advenoides</i> Lwe. |
| <i>chlorata</i> Lwe. | v. <i>hyæna</i> Lwe., iv, 192. |
| v. <i>planata</i> Lwe., iv, 191. | <i>L. furva</i> Lwe., iv, 192. |
| v. <i>craticulata</i> Lwe., iv, 191. | <i>L. (?) exornata</i> Dh., iv, 198. |
| <i>scrobiculata</i> Lwe. | |

(*Species of the Azores Is.*)

- | | |
|---|---------------------------------------|
| <i>L. azorica</i> Alb., iv, 196. | <i>L. terceirana</i> Morel., iv, 197. |
| <i>L. caldeirarum</i> M. & D., iv, 196. | <i>L. drouetiana</i> Morel., iv, 197. |
| <i>L. niphas</i> Pfr., iv, 196. | <i>L. vetusta</i> M. & D., iv, 198. |

(Species of the Cape Verde Is.)

- | | |
|-------------------------------|-----------------------------------|
| L. advena W. & B., iv, 192. | L. leptostyla Dohrn, iv, 194. |
| L.serta Alb., iv, 193. | <i>milleri</i> Dohrn. |
| L. fogoensis Dohrn, iv, 193. | L. primæva Morel., iv, 195. |
| L. visgeriana Dohrn, iv, 193. | L. atlantidea Morel., iv, 195. |
| L. myristica Sh., iv, 194. | L. subroseotincta Woll., iv, 195. |
| L. bollei Alb., iv, 194. | |

(Imperforate, thin, acutely keeled, with 3 to 4 rapidly widening whorls.

LAMPADIA. *Madeira, Canaries.)*

- | | |
|----------------------------|-------------------------------|
| L. webbiana Lwe., iv, 200. | L. membranacea Lwe., iv, 201. |
| <i>Vit. bocagei</i> Paiva. | L. cuticula Sh., iv, 201. |

Genus FRIDOLINIA Pilsbry, 1894.

Shell large, heavy, depressed-turbinate, umbilicate when young, closed in the adult; surface obliquely coarsely malleated. Last whorl large, descending in front and strongly constricted behind the lip, swollen in the middle of the base. Aperture very oblique, toothless; peristome narrowly reflexed, its remote terminations joined by a callus, the basal and columellar margins thickened by a heavy callus within. Type *H. lucani* Tourn., pl. 71, figs. 55, 56.

This group, the type of which is a Miocene fossil of Dijon, is distinguished mainly by the tumid base, strong constriction behind the lip, and coarse sculpture. Its affinities are problematic.

Section *Pseudoleptaxis* Pilsbry, 1894.

Shell solid, imperforate, globose, sculptured with oblique wrinkles; last whorl large, rounded, constricted behind the thickened, expanded lip. Aperture lunate, oblique; columellar lip dilated. Type *H. corduensis* (Noul.) Sandb., pl. 71, figs. 57, 58.

Perhaps to the Oligocene type of this group is to be added the lower Miocene *H. ramondi* A. Braun, but that form may really belong to *Plebecula*.

Genus DENTELLOCARACOLUS Oppenheim, 1890.

Dentellocaracolus OPPENH., Denkschr. K. Akad. Wissensch. lvii, p. 117.

Shell imperforate or covered perforate, globose-conic, more or less keeled, the base rather flattened; whorls $4\frac{1}{2}$ to $6\frac{1}{2}$, the last

suddenly descending in front a third or more the total alt. of shell. Aperture oval or horse-shoe-shaped, horizontal; margins thickened and reflexed, joined by a callus. Type *D. damnata* A. Brong., pl. 71, figs. 53, 54.

This genus is established for certain heavy, rough sculptured *Helices* from the N. Italian Eocene, characterized by the extreme obliquity of the aperture, the heavy parietal callus, and the aspect of the West Indian *Pleurodonte formosa*, or the Canary Island *Hemicyclas*. Some *Obba* species are also similar. I am totally unable to recognize any affinity between these shells and the Antillean *Helices*, and regard the superficial resemblance as merely a case of convergence of shell characters, meaningless from a phylogenetic standpoint. Whether the group is to be referred to the *Epiphallagona* or the *Belogona* is doubtful, and dogmatic assertions are clearly uncalled for.

The species *damnata* Brong., *coriacea* Sandb., *amblytropis* Sdb., *hyperbolica* Sdb., *antigone* Oppenh. and *mazzinicola* Greg. belong here.

Section *Prothelidomus* Oppenheim, 1890.

Prothelidomus OPPENH., *t. c.*, p. 120.

Shell imperforate, solid, globose-depressed; whorls $4\frac{1}{2}$, the last protracted and sometimes carinated toward the aperture. Aperture horizontal, oval or horse-shoe-shaped; peristome thickened, edentulous, the margins joined by a strong parietal callus. Type *P. acrochordon* Oppenh., pl. 71, figs. 51, 52.

This group is only feebly distinguished from the preceding, and as with that, I am obliged to discredit entirely the relationships implied by its name. It contains *H. acrochordon* Oppenh. (*radula* Sandb. not Pfr.), and *H. oppenheimi* de Greg. (= *H. vicentina* Oppenh. not Shaur). The sculpture of the former is like that of *Pleurodonte lima*, but the second species is smooth. This shows how much dependence is to be placed on a sculpture resemblance, a subject discussed at more length in the introduction to this volume.

H. declivis Sandb., which Oppenheim places in *Eurycratera*, may belong near or in this group or in *Dentellocaracolus*.

The peculiar minute form described by Stache as *Obbinula anthracophila* (Abh. K. K. Geol. Reichsanst. xiii, p. 119) from the *Stomatopsis* Horizon, "Cretaceo-eocene" of Carniola, may prove to

belong to the *Helicidæ*, but even this is doubtful. It occurs in company with *Stomatopsis*, a peculiar genus of *Melanopsidæ*, in beds considered to lie at the base of the Eocene. The claim of *Obbinula* to kinship with *Obba* is, there can be little doubt, an illusion.

Genus HELICIGONA Ferussac, 1819.

=*Helicigona* (FER.) Risso, + *Chilotrema* and *Arianta* Leach, 1831, + *Chilostoma*, *Latomus* and *Isognomostoma* FITZ., 1833, + *Cingulifera*, *Corneola* and *Lenticula* HELD, 1837, + *Campylæa* BECK, 1837, + *Sterna* ALB., 1850, + *Elona* ADS., 1855, etc., etc.

Shell usually depressed-globose, varying to globose-turbinate or lens-shaped, usually umbilicated, of moderate or large size; surface smooth, costulate, granulate or hairy, corneous or brown; unicolored mottled or streaked, and either with a single supra-peripheral band or with one above and one below this, or bandless. Aperture oblique, lunate or oval, the lip expanded, reflexed below and dilated at columellar insertion. Type *H. lapicida* L. (see pl. 43, figs. 19-25, 27, 28, 31-35, 42, 46).

Animal externally as in *Helix*. Jaw strong, with 2 to 16 stout convex ribs, dentating the cutting edge. Radula as in *Helix*, the ectocones sometimes developed on middle and lateral teeth, sometimes represented by lateral continuations of the mesocone.

Genitalia (pl. 62, all figs.) having the penis short, continued in an epiphallus upon which the retractor is inserted, and ending in a well developed, spirally twisted flagellum. Dart sack single, inserted rather high on vagina, containing a curved dart with round shaft and flat, 2-bladed head; the base not coronated. Mucus glands 2, long and tubular, often bifid; inserted on vagina near base of dart sack (but in *H. quimperiana* there are 3 triangular lobes on each side). Spermatheca small and globose, on a long duct; diverticulum long, larger than spermatheca-duct, connected with the uterus throughout by a broad thin membrane (shown in figs. 16, 18, removed in the other figures on pl. 62). See pl. 62, fig. 16, *H. rhætica*; fig. 17, *H. cingulata*; fig. 18, *H. planospira*; fig. 19, *H. personata*; figs. 20, 21, *H. lapicida*; figs. 22, 23, *H. arbustorum*; figs. 24, 25, 26, 27, *H. quimperiana*).

Distribution; Europe, from the Pyrenees and Greece to Sweden and England. For geological distribution see under *Chilostoma* and the extinct subgenera.

The true limits of this genus were first indicated by Schmidt, and have been confirmed by the researches of numerous later authors. The two-bladed type of dart, the broad diverticulum bound to uterus by a wide membrane traversed by blood-vessels, and the two mucus glands, which are either simple and vermiform or once split, are all characters unlike *Helix* or other genera of *Belogona*. The shell is never five-banded as it is in *Helix*, but has either two bands above, one below the periphery, or only the middle band is retained, or it is bandless.

The form of the dart is not alone diagnostic, for *Eremina* and some *Iberus* approach the two-bladed type. *Helicigona* is the only genus known to me in which the diverticulum is a constant generic character; and here it seems to be much more highly developed than in any other group.

The shell shows a considerable range of mutation in form and sculpture, sometimes being acutely keeled as in *H. banatica*, *canthensis* and *lupicida*, and again globose or subglobose as in *arbustorum*, *ehingensis* and the *Tacheocampylæas*. In some forms, such as *H. lepidotricha* and *ehingensis*, the margin of the umbilicus is obtusely angular, as in some *Chloritis*; and high authorities have indeed referred the former species to this genus. In my opinion such reference is wholly uncalled for. I would as soon consider *Lysinoë ghiesbreghti* or *Epiphragmophora rémondi* species of *Chloritis* on account of the similar angled umbilicus and quincuncial sculpture. We must have better evidence than these unstable and frequently repeated characters, before admitting *Chloritis* to the European fauna. The claim of *Metafruticicola* (p. 276) to a place in the genus *Chloritis* is far better than that of *H. lepidotricha* and its allies. The variety of sculpture found in *Helicigona* is equally remarkable; some species being quite smooth, others, as *gobanzi* and *hemonica*, heavily ribbed; and still other forms, such as *lepidotricha*, *rahtii*, *setosa*, *benedicta* have bristles or their papillæ arranged in regular quincunx or oblique sweeps, besides a still more minute granulation of the whole surface. In some species this regular sculpture extends to the very apex, being exactly like that of *Chloritis*, *Moellendorffia* and a few other *Helices* of very diverse groups.

Synopsis of subgenera and sections.

RECENT GROUPS.

1. Aperture oval or lunate; lip 1-toothed or toothless.
 - a. Spire convex or conoidal; mucus glands tubular.

b. Acutely keeled ; lip continuous across parietal wall.

HELICIGONA.

bb. Depressed, not keeled ; or if keeled the lip-ends remote,
Chilostoma, Fruticocampylæa.

bbb. Subglobose, with narrow or closed umbilicus.

c. Baso-columellar lip broadly reflexed, *Tacheocampylæa.*

cc. Lip narrow, dilated only at insertion, *Arianta.*

aa. Spire flat, sunken in middle ; mucus glands short, triangular,
ELONA.

2. Aperture ear-shaped, 3-toothed, ISOGNOMOSTOMA.

TERTIARY GROUPS.

1. Shell with pappillæ arranged in oblique series as in *H. setosa*,

a. An obtuse angle around umbilicus ; periphery rounded,
TROPIDOMPHALUS.

aa. Umbilicus narrow or closed ; periphery acutely keeled,
Metacampylæa.

2. Shell without regularly placed pappillæ.

a. Large, depressed, with broad peristome, MESODONTOPSIS.

aa. Subglobose, spire conoidal, peristome narrow,
GALACTOCHILUS.

Section *Helicigona* (Fér.) Risso.

Helicigona FER. *l. c.* (in part).—RISSE, Hist. Nat. Eur. Mérid. iv, p. 66, first species *H. lapicida*.—*Caracolla* TURTON, Man. L. and Fr.-W. Sh. Brit. Is., 1831, p. 66, and of some other authors.—*Chilostrema* LEACH in Turton, *l. c.*, p. 66, and of Beck, *et al.*—*Iatomus* FITZ., Syst. Verz., 1833, p. 97.—*Lenticula* HELD, Isis, 1837, p. 913.

Shell umbilicate, depressed, *lens-shaped and acutely keeled* ; surface minutely granulous, horn-colored or dusky, obliquely streaked with brown ; last whorl deeply deflexed below the keel ; aperture very oblique, oval, angled at keel, the peristome reflexed below, thickened within, continuous and raised across the parietal wall, toothless. Type *H. lapicida*, pl. 43, figs. 22, 23.

Jaw with four strong ribs ; radula having no side cusps on middle and lateral teeth ; marginals developing an ectocone, and the large cusp become bifid. Genitalia (pl. 62, figs. 20, 21, *H. lapicida*) with penis, epiphallus and flagellum as usual. Two long mucus glands ; dart-sack containing a curved dart with cylindrical shaft and short,

flat, two-edged head (fig. 21); spermatheca duct branching into a diverticulum about as long as itself.

This section contains a single species commonly distributed throughout middle and northern Europe.

H. lapicida L. iv, 117.

v. *medalpedensis* Cl. iv, 261.

v. *andorrica* Bgt.

Section *Chilostoma* Fitzinger, 1833.

Chilostoma FITZ., Syst. Verz., 1833, for *C. corneum* (= *H. cornea* Drap.), *C. zonatum* (= *foetens* Stud.) *C. pulchellum* (= *pulchella* Müll., type of the prior genus *Vallonia*).—CHARP., Cat. Moll. Terr. et Fluv. Suisse, 1837, p. 8, for *cingulata*, *zonata*, *foetens*, *pulchella*.—GRAY, A List of the Genera of Recent Mollusca, their Synonyma and Types, P. Z. S. 1847, p. 172 (type *H. foetens*).—MOQUIN-TANDON, Hist. Nat. Moll. Terr. et Fluv. France, ii, p. 131, for *foetens* and *cornea*.—*Campylaea* BECK, Index Moll. 1837, p. 24.—LOWE, P. Z. S. 1854.—ALBERS, Die Hel. 1850, p. 81.—MARTENS, Die Hel. 1860, p. 122 (type *H. cingulata* Stud.).—*Cingulifera* HELD, Isis, 1837, p. 911, for *zieglerei* Schm., *intermedia* Fér., *cingulata* Stud., *arbusorum* L., etc.—*Corneola* HELD, ibid., p. 912, for *hirta*, *feburiana*, *setipila*, *planospira*, *foetens*, *pulchella*, etc., etc.—*Zonites* HARTM., Gastr. Schw., p. 161, not of Montf.—*Eucampylaea* PFR., Nomencl. Hel. Viv. 1878, p. 144.—WESTERLUND, Fauna, p. 103.

Shell depressed, openly umbilicated, with convex spire and rounded (rarely keeled) periphery. Surface unicoloried or 1-3 banded, smooth, costulate or hirsute. Whorls about $5\frac{1}{2}$, the last deflexed in front; aperture wide lunate or suboval, toothless or with a basal tooth; peristome narrowly expanded, reflexed below, dilated at columellar insertion, rarely continuous across the parietal wall. Type *H. foetens* Studer. (See pl. 43, figs. 27, 28, *H. planospira* Lam.; pl. 43, fig. 42, *H. setosa* Ziegler.)

Jaw strong, with 2 to 10 stout ribs grouped near the middle. Radula with mesocones only developed on median and lateral teeth; marginals with an inclined bifid inner and small outer cusp. Genitalia as described for the genus.

In the recent fauna this group is characteristic of the Alpine Mountain system, extending down the Italian peninsula to Sicily, and the Balkan peninsula to southern Greece. A few species occur

in south-western France. It is therefore more southern in distribution than *Arianta*, *Elona* or *Helicogona s. str.* In the lower miocene deposits of north-central Europe, a number of species typical in form occur, such as *H. inflexa* Klein, *H. exstincta* Ramb., *H. standfesti* Penecke. Specimens of *inflexa* and *standfesti* before me retain a distinct trace of the shoulder-band.

The disappearance of the name *Campylæa* from *Helix* nomenclature is to be regretted, and will probably fail to find many advocates for some years to come. That the course here taken is inevitable, will be obvious if the history of the name is considered. *Chilostoma* Fitz., 1833, and *Campylæa* Beck, 1837, were both proposed without diagnosis, and both contained some incongruous elements. If *undefined* names are to be rejected, then both of these must give way to *Cingulifera* Held, proposed with an excellent diagnosis in 1837. If, however, the list of species cited be accepted in lieu of a diagnosis, then *Chilostoma* must be accepted on the ground of four years' priority, as Moquin-Tandon has recognized. *In either case, Campylæa becomes a synonym!* Those who continue to use a generic or subgeneric name, which is so clearly inadmissible as this one, must do so in defiance of rules of nomenclature recognized as binding by zoologists generally, for *Campylæa* is neither the earliest name for the group, nor the earliest properly defined name. Neither is it the earliest properly limited group, for Beck's list contains a number of species not belonging to this genus.

- | | |
|------------------------------------|-------------------------------|
| H. pouzolzi Desh., iv, 87. | v. bosnensis Kob., iv, 88. |
| savignyana Ehrenb. | ? ragusana Fér., undesc. |
| varronis Cantr. | trizona Rve. |
| brenoensis & macarana Mhl. | v. silvestris West. |
| dinarica Bgt.! | H. soccaliana Let. |
| ? dalmatina Parr., dalmatica | H. serbica Mlldff., iv, 88. |
| Dh., gravosaensis Muhl. | f. roschiti (Kim.) W. |
| f. elevatior, depressior, bifasci- | f. unitæniata Bttg., iv, 88. |
| ata Brus.; unifasciata, uni- | H. pancici Mlldff., iv, 88. |
| color Pfr., obscura Blz., | H. banatica Partch, iv, 97. |
| kuznici, pellanica, adriat- | H. stenomphala Mke., iv, 88. |
| ica, tschernagorica, diocleti- | H. setigera Zgl., iv, 100. |
| ana, sabljari, horatii, biagioi, | f. globulosa Kucik. |
| brenoica, daniloi, cantrainei | H. hoffmanni, Partch, iv, 99. |
| Bgt., viii, 231. | monozona Z. |
| v. montenegrina Zgl., iv, 88. | H. walteri Bttg., iv, 98. |

- H. kleciachi Parr., iv, 99.
 klecaki Pfr.
 H. insolita Zgl., iv, 98.
 insolida auct.
 subcostalis Parr.
 H. prætexta Parr., iv, 99.
 prætextata Kob.
 H. narentina Klec., iv, 99.
 v. reiseri Branc.
 H. denudata Rossm., iv, 98.
 H. imberbis Brus., iv, 97.
 H. nicolai Klec., iv, 98.
 recordera Parr.
 H. trizona Zgl., iv, 108.
 v. inflata Blz.
 v. rumelica Z.
 v. dobruschæ Cless.
 v. balcanica Friv.
 v. frauenfeldi Zel.
 H. hæterea West.
 H. cœrulens Mhl., iv, iii.
 lacticini Z.
 f. hyllica, depressa rugata,
 bukowicanica, zrmanjæ Brus.
 H. cornea Drap., iv, 110.
 v. castanea Rm., iv, 111.
 v. squammatina Serres.
 H. desmoulinsi Far. iv, 111.
 moulinsii P. & M.
 acrosticha Fisch.
 mollerati Morel.
 v. crombezi Mill.
 H. pterolakæ Kob.
 langi Pfr., Bttg.
 H. phocæa Roth., iv, 103.
 f. ornata Parr.
 f. inornata Kob.
 v. langi Parr., iv, 102.
 H. cingulata Stud., iv, 104.
 luganensis Schintz.
 v. inornata Rossm.
 unicolor West.
 rossmüssleri Cl.
 v. anauniensis de Bett., iv, 105.
 v. athesina Paul., iv, 105.
 f. pinii Adami, iv, 106.
 v. baldensis Villa, iv, 105.
 v. bizona Rossm., iv, 106.
 v. lucensis Paul., iv, 106.
 H. carrarensis Porro., iv, 105.
 v. montana Paul., iv, 107.
 v. kobeltiana Paul., iv, 107.
 H. planospira Lam., iv, 89.
 vittata Jan.
 v. *etrusca* Kob.
 v. stabilei Paul.
 f. illasyaca Adami.
 v. ullepitschi West., iv, 90.
 v. kobeltiana Cless., iv, 90.
 v. illyrica Stab., iv, 90.
 v. padana Stab., iv, 90.
 f. euganea Stab., iv, 91.
 v. erjaveci Cless.
 v. istriana Stoss.
 v. pubescens Tib., iv, 91.
 v. casertana Paul., iv, 91.
 v. alifaensis Paul., iv, 92.
 v. calva Kob., iv, 91.
 depilata Orsini.
 v. setulosa Brig.
 setipila Zgl.
 setosa Costa.
 setulosa Auct.
 v. cantabrica Paul., iv, 91.
 f. depressa Paul.
 f. globosa Paul.
 v. neapolitana Paul., iv, 91.
 f. depressa Paul.
 f. luteola Paul.
 v. cassinensis Paul., iv, 91.

- v. occultata Paul.
 v. pavelii Haz.
 H. tiesenhauseni Gredl., viii, 227.
 H. macrostoma Mhl., iv, 92.
 siculina Zgl.
 pervia & *didyma* Mhl.
 v. ereta Paul., iv, 92.
 v. cryptozona Zgl.
 v. confusa Ben., iv, 92.
 H. benedicta Kob., iv, 92.
 lefeburiana Phil.
 setipila Benoit.
 v. trichothroa Bgt.
 v. choelotricha Bgt.
 H. schlerotricha Bgt., iv, 96.
 sclerotricha Auct.
 H. hirta Mke., iv, 89.
 deplana Zgl.
 H. lefeburiana Fér., iv, 89.
 feburiana Auct.
 hirsuta Brumati.
 H. sadleriana Zieg., iv, 89.
 H. möllendorffi Kob., iv, 95.
 H. hazayana Cless., iv, 89.
 H. setosa Zgl., iv, 97.
 f. convexior W.
 f. litoralis Brus., iv, 97.
 H. brusinae Stoss., iv, 98.
 v. velebitana Klec.
 H. crinita Sandri, iv, 100.
 H. preslii Schm., iv, 104.
 cingulata Held.
 v. nisoria Rm., iv, 104.
 intermedia Paul.
 v. nicatis Costa iv, 101.
 v. affinis Paul., iv, 106.
 v. appellii Kob., iv, 105.
 v. anconae Gent., iv, 106.
 v. agnata Paul., iv, 107.
 v. amathia Bgt.
 H. colubrina Jan., iv, 105.
 v. nubila Zgl., iv, 106.
 v. fascelina Z., Gred.
 H. gobauzi Ffld., iv, 107.
 v. sigela Bgt.
 v. compsopleura Bgt.
 v. perfecta Bgt.
 H. tigrina Ch. & Jan., iv, 107.
 v. subtigrina Bgt.
 H. frigida Jan., iv, 101.
 f. insubrica Jan., iv, 101.
 H. cingulella Zgl., iv, 104.
 zingulella H. & A. Ad.
 f. gyrata West.
 f. scutellata West.
 H. pyrenaica Dr., iv, 94.
 v. complanata Bgt., iv, 95.
 xanthelea (B.) Fag.
 v. semiclathrata West.
 H. faustina Zgl., iv, 95.
 v. sativa Z.
 v. associata Z.
 favirensis Parr.
 v. citrinula Z.
 v. charpentieri Schol.
 v. fortunata Parr.
 v. subflava Kim.
 H. rossmässleri Pfr., iv, 96.
 advena Rm., preoc.
 v. bridayi Branc.
 H. phalerata Zgl., iv, 100.
 v. chamæleon Parr., iv, 101.
 H. glacialis Thom., iv, 109.
 v. vesulana Less.
 v. chiophila Bgt.
 H. alpina F.-B., iv, 100.
 v. alpicola West.
 v. fontenilli Mich., iv, 100.
 tigrina v. michaudiana Rm.
 H. schmidtii Zgl., iv, 103.

- H. hessei* Kim., iv, 103.
H. hermesiana Pini, iv, 100.
 v. frigidescens DelPrete, iv, 105.
 v. apuana Iss., iv, 105.
 v. ligurica Kob., iv, 101.
 v. frigidissima Adami.
H. nicolisiana Ad., viii, 227.
H. intermedia Fér., iv, 109.
 catenulata Muhl.
 cornea Brum.
H. zieglerei Schm., iv, 109.
H. æmula Rossm., iv, 109.
 ambrosia Strobel.
 martinatiana de Betta.
H. ichthyomma Held, iv, 93.
 v. achates Z., iv, 93.
 cingulina Dh.
 achatina P. & M.
 foetens C. Pfr., iv, 93.
H. zonata Stud., iv, 92.
 v. flavovirens D. & M.
 v. monozonata Poll.
 v. modesta Moq., iv, 92.
H. foetens Stud.
 v. millieri Bgt., viii, 228.
H. strobili Less.
H. cisalpina Stab., iv, 94.
 gallica Bgt.
 sebinensis Kob.
 adelozona Parr.
 v. debettai Ad. iv, 94.
 v. adamii Kob., iv, 94.
 v. rhætica Mouss., iv, 94.
H. argentellei Kob., iv, 94.
H. peritricha Bttg., viii, 230.
 v. erymanthia Kob.
H. kollari Zel., iv, 94.
H. hemonica Thiesse.
H. pindica Bttg., iv, 96.
H. choristochila Bttg., iv, 102.
H. gasparinæ Charp., iv, 102.
 v. subdeflexa Bttg., iv, 102.
H. olympica Roth, iv, 101.
 thessalonica Mouss.
 v. ossica Bttg., iv, 102.
 v. magnesiae Bttg., iv, 102.
 v. sciara West.
H. broemmei Kob., viii, 229.
H. conemenosi Bttg., viii, 229.
 v. acarnanica Kob., viii, 220.
H. oetæa Mart.
H. subzonata Mouss., iv, 93.
 v. distans Bl. & W., iv, 93.
 v. depressa Bttg., viii, 228.
H. brenskiei Bttg., iv, 113.
H. comeophora Bgt., iv, 96.
 comythophora Bttg.
 f. krüperi Bttg.
H. eliaica Kob.
H. cyclolabris Desh., iv, 114.
 v. euboea Parr.
 v. arcadica Parr.
 v. hymetti Mouss.
 v. sphæriostoma Bgt.
 lysiostoma Shutt.
 v. heldreichi Shutt.
 v. amorgia West.
 v. grelloisi Bgt., iv, 114.
 v. bacchica Mart.

Section *Fruticocampylæa* Kobelt, 1871.

Fruticocampylæa KOBELT, Catal. Eur. Binnenconch., p. 13.

Shell with moderate or small umbilicus, rather depressed, the surface granulated or spirally striated, generally with a peripheral

white band bordered above and below by dark bands; aperture oval, basal lip expanded. Type *H. raverigiensis* Fér. (pl. 43, figs. 24, 25; *H. narzanensis* Kryn.).

Anatomy unknown. This group of *Campylæa*-like shells is confined to the Caucasus region and adjacent lands to the south. It may prove to belong to the *Hygromia* series, but is better left here until examined anatomically. The distribution of *Fruticocampylæa* is not continuous with that of other *Helicigonas*.

- | | |
|--------------------------------------|--|
| <i>H. appeliana</i> Mouss., iv, 85. | <i>H. joannis</i> Mort., iv, 86. |
| <i>appelinsi</i> Auct. | <i>dumonti</i> Mort. |
| v. <i>mediata</i> West. | <i>H. dichrozona</i> Mart. |
| <i>H. narzanensis</i> Kryn., iv, 84. | <i>H. delabris</i> Mouss., iv, 86. |
| <i>hortensis</i> Ménétr. | <i>f. alia</i> West. |
| <i>ossetinensis</i> Bayer. | <i>H. pontica</i> Bttg., iv, 86. |
| <i>f. bicingulata</i> Bttg. | <i>H. nymphæa</i> Dub. |
| <i>f. castanea</i> Bttg. | <i>H. raverigiensis</i> Fér., iv, 85. |
| <i>f. subunicolor</i> Bttg. | <i>raverigii</i> Kryn. |
| <i>f. perlineata</i> Mouss. | <i>raverigieri</i> Bttg. |
| v. <i>suanetica</i> Bttg. | <i>limbata</i> Kryn. |
| v. <i>macromphala</i> Bttg. | <i>caucasica</i> Pfr. |
| v. <i>cyclothyra</i> Bttg. | v. <i>persica</i> Bttg., iv, 85. |
| v. <i>olivacea</i> Bttg. | <i>H. transcaucasica</i> Bay., iv, 85. |
| v. <i>kobensis</i> Bttg. | <i>f. pygmæa</i> Bttg. |
| v. <i>depressa</i> Bttg. | <i>H. phæolema</i> Bttg., iv, 87. |
| <i>H. pratensis</i> Pfr., iv, 85. | <i>H. eichwaldi</i> Pfr., iv, 86. |
| <i>bayerii</i> Parr. | v. <i>daghestana</i> Parr., iv, 86. |
| <i>f. unicolor</i> Bttg. | <i>H. armeniaca</i> Pfr. iv, 86. |
| <i>f. alutacea</i> West. | <i>airumia</i> Siem. |
| v. <i>perforata</i> West. | ? <i>nivalis</i> Ménétr. |
| v. <i>depressa</i> Kob. | ? <i>menetriesii</i> Kalen. |
| v. <i>solidior</i> Kob. | |

Section *Tacheocampylæa* Pfeiffer, 1877.

Tacheocampylæa PFR., Malak. Bl., xxiv, 1877, p. 8, type *H. raspaili* Payr. See for anatomy, MOQ.-TAND., pl. 12, f. 11-14.

Shell depressed with low spire, the body whorl not keeled; imperforate or partly covered umbilicate; smoothish, sometimes hairy; brownish, yellowish or olive, with two bands above, one below the periphery. Aperture truncate-oblong, very oblique; outer lip

reflexed, baso-columellar lip straightened or arcuate, its edge broadly dilated and reflexed. Type *H. raspailii*, pl. 43, figs. 33, 34, 35.

Jaw (of *H. raspailii*) arched, with three separated ribs. Epiphragm flat, thin and membranous, with some calcareous particles. Genital system furnished with a curved dart (pl. 63, fig. 7 *H. raspailii*) 10–12 mill. long, swollen and channelled at base, then constricted, widening again in the middle, four bladed (?). Mucus glands four-fingered.

This group has the characteristic shell of *Campylæa*, but the four-fingered mucus glands and the apparently quadrangular dart are characters like *Tachea* and *Otala*. It may prove to be a transition group. A further investigation is needed to demonstrate its affinities, and especially should the dart and the diverticulum of the spermatheca duct be examined, as these structures afford the only criterion for the separation of the true *Helices* from the *Campylæa* or *Helicigona* group. The species are all from Sardinia and Corsica.

H. raspailii Payr., iv, 112.

v. *acropachia* Mab.

v. *lenelaia* Mab.

v. *pilosa* Kob., iv, 112.

v. *garciai* Hagenm.

H. insularis Cr. & Deb., iv, 112.

H. brocardiana Dut., iv, 112.

v. *omphalophora* Dut.

v. *sciaphila* Hagenm.

v. *donata* Hagenm.

H. cyrniaca Dut., iv, 112.

v. *revelierii* Deb., iv, 112.

v. *planospira* Payr.

v. *tachiggyra* West.

v. *montigena* Hagen.

v. *faucicola* Hagen.

H. gennarii Paul., iv, 113.

H. carotii Paul., iv, 112.

f. *major*, *unifasciata*, *viperina*,
lamarmoræ, *spectrum*, Mal-
zan, iv, 113.

H. melonii Malz., iv, 113.

Unfigured forms: *H. vittalacciana* Mab., *romagnolii* Dut., *melliniana* with var. *deschampsiana*, and *arusalensis* Hagenmüller.

Section *Arianta* Leach, 1831.

Arianta LEACH in Turton's L. and Fw. Shells Brit. Is., p. 35 (for *H. arbustorum*).—BECK, Index, p. 41 (in part).—HARTMANN, Gast. Schw., p. 55.—*Arionta* v. MARTENS, Die Hel., 1860, p. 127, (exclusive of all but type, *H. arbustorum*). Not *Arionta* of American authors!

Shell globose or globose-depressed, with convex or conoidal spire, and narrow or closed umbilicus; surface shining, spirally striated, usually with a suprapraperipheral band, and mottled or dark coloring. Aperture round-lunate, oblique, toothless; lip expanded and white-lipped, reflexed at columellar insertion. Type *H. arbustorum* L., pl. 43, fig. 46.

Jaw with 6-10 strong ribs. Radula having outer side cusps developed on middle and lateral teeth. Marginals with bifid inner and simple outer cusps. Genital system (pl. 62, figs. 22, 23, *H. arbustorum*) showing the features usual in *Helicigona* throughout. The two simple mucus glands are very long; dart sack containing a curved dart (fig. 22) like that of *H. lapicida*. Diverticulum bound to uterus by a wide membrane traversed by blood vessels.

Distribution, middle and north Europe, upper Pliocene and Loess deposits. In the modern fauna this species or group of species, is distributed from the northern boundary of the Olive zone (Pyrenees and Alps) to Sweden, enjoying a far greater range than any other member of the genus *Helicigona*, especially in its ability to withstand the cold. The number of local races is remarkable, and their study is much complicated by the fact that forms with a similar aspect occur in widely separated localities, probably due to parallel development. Typically many of these varieties are very different, but intermediate forms seem to abolish most boundary lines; so that Kobelt, in his latest contribution on the subject, is not willing to endorse even the main forms as species (Iconogr. n. F., vi, p. 60).

The spelling of this name given above is that of Leach, Beck and other early authors. Von Martens has changed the name to "*Arionta*" on etymological grounds. The single well defined species *H. arbustorum*, is a typical *Helicigona* in anatomy, having the diverticulum bound to the uterus by a broad membrane, the two long, cylindrical mucus glands inserted on vagina, and other features diagnostic of that genus. The American species referred to *Arionta* by authors present nothing of the sort; the diverticulum has no membrane; the mucus glands are bulbiferous and inserted on dart sack, etc., etc.

H. arbustorum L., iv, 117.

v. *conoidea* West., iv, 118.

v. *calcareia* Högb., iv, 118.

v. *picea* Zgl., iv, 117.

wittmanni Zow.

v. *jetschini* Ulic., iv, 117.

<i>H. arbustorum</i> Linné.	<i>subalpina</i> Scholtz.
v. <i>canigonensis</i> Boub.	<i>f. costulata</i> Kob.
<i>canonica</i> Fag.	v. <i>doriæ</i> Paul., iv, 117.
v. <i>fagoti</i> Bgt.	v. <i>rudis</i> Mühlf., iv, 118.
v. <i>xatarti</i> Far., iv, 118.	v. <i>corneoliformis</i> Less.
v. <i>repellini</i> Charp., iv, 118.	v. <i>styriaca</i> Ffld., iv, 119.
v. <i>alpicola</i> Fér.	<i>H. æthiops</i> Blz., iv, 118.
<i>alpestris</i> Z., iv, 118.	<i>H. camprodunica</i> Kob., iv, 118.

Other named forms of *H. arbustorum*, some of which have doubtless good claims to racial distinction. are: Var. *thamnivaga*, *hypnicola*, *themita* Mabille; var. *dravica*, *vibraiana*, *musdorfensis*, *illusana* Servain; var. *sendtneri*, *excelsa*, *septentrionalis* Clessin; var. *albulana*, *feroeli*, *knitteli*, *nazarina*, *trachia* (Bgt.) Serv.; var. *creticola* Mörch.; var. *trochoidalis* Roffiæn; var. *depressa* Held.; var. *baylei* (Lecoq) Moq.; var. *gotlandica*; *oelandica* West. Also *forma* *flavescens*, *albina*, *rufescens*, *draparnaudia*, *poiretia*, *boissieria*, *thomasia* Moquin-Tandon; *f. efasciata* Westerlund; *f. lutescens*, *luteofasciata*, *fuscescens* D. & M. (= *marmorata* Taylor); *f. morbosualbina* Rossm.; *f. nigrescens* Locard, *f. fusca* Fér.; *f. cincta* (= *pallida* Tayl.), *sinistrorsum* Taylor; *f. minima* and *major* Pfr.

Subgenus *ELONA* H. & A. Adams, 1855.

Elona H. & A. AD., Gen. Rec. Moll. ii, p. 211, type *H. quimperiana* (June, 1855). Not *Elona* Moq.-Tand., 1855.—*Sterna* ALBERS, Die Hel., p. 93, 1850, same type (preoccupied).—See HESSE, Jahrb. D. M. Ges., xii, 1885, p. 45, pl. 3, f. 1 (anatomy).

Shell umbilicate, *planorboid*, the *spire slightly concave*, periphery broadly rounded; corneous with a few varicoid white stripes; aperture lunar, slightly oblique; lip white, expanded above, reflexed below, the ends distant. Type *H. quimperiana* Fér., pl. 43, figs. 19, 20, 21.

Jaw with 11–16 narrow ribs. Genitalia (pl. 62, figs. 24, 25, 26, 27, *H. quimperiana*) differing from the typical *Helicigonas* in having the *mucus glands shortened into triangular sacks* (fig. 26) and the dart sack is inserted in a sort of calyx at base (fig. 27). Dart curved at the end, with lens-like section (fig. 24).

This group contains a single French species remarkable for its *Chloritis*-like shell and the peculiar mucus glands. The latter con-

sist of short lobes, somewhat as in *Eulota*; but unlike that genus, they are *inserted on vagina well above the dart sack*, so there can be no doubt that they are merely a shortened form of the finger-like glands characteristic of *Belogona Siphonadenia*.

H. quimperiana Fér., iv, 116. Brittany; Spain.

kermorvani Coll.

corisopitensis Dh.

Subgenus ISOGNOMOSTOMA Fitzinger, 1833.

Isognomostoma FITZ., Syst. Verzeichniss der in Erzherzogthume Oesterreich vorkommenden Weichthiere, p. 97, sole species, *I. personatum* Eitz., = *H. personata* Drap.—*Isognomonostoma* TRYON—*Triodopsis* of modern European authors, not of Rafinesque!—*Plicostoma* SCHLUTER, Syst. Verz., 4, 1838. See for anatomy Schubert, Archiv f. Naturg., 1892, p. 11, pl. 1, f. 15-18 (Good!)

Shell depressed-globose, with low convex spire, narrow or closed umbilicus and rounded or faintly angular periphery; surface smooth, hirsute in quincuncial pattern. Aperture oblique, ear-shaped; *peristome flatly reflexed*, thickened within, *toothed on outer and basal margins*; *terminations connected by a raised, tongue-like parietal process*. Type *H. personata*, pl. 43, figs. 31, 32.

Jaw with about 5 strong ribs, dentating the cutting margin; radula with large triangular mesocones on middle and inner lateral teeth; marginals with a bifid inner and simple outer cusp. Genital system (pl. 62, fig. 19, *H. personata*) with penis as usual in the genus; 2 long mucus glands; an elongated dart sack containing a dart of typical *Helicigone* form, base dilated, shaft slender and round, spreading into a two-bladed, laurel-leaf shaped head. Diverticulum bound to uterus by a broad membrane, as usual in *Helicigona*.

Distribution, middle Europe and Siberia.

The anatomy of this group is typical of *Helicigona* (*Campylæa*), having the diverticulum membrane found in *that genus only*, (removed in the figure), as well as the characteristic form of mucus glands and dart. These features of the genital system, as well as the strongly ribbed jaw, show that the association of *H. personata* with "*Gonostoma*" is entirely illusory. In fact Schubert, in his anatomical characterization of "*Anchistoma*" ("*Gonostoma*" + "*Triodopsis*") was obliged to make an exception of *H. personata*,

and to compare it with *Campylæa*; but strangely enough he does not alter the current classification of the species. The resemblance of *H. personata* to the American *Triodopsis* is merely a case of incomplete parallelism. The two groups are readily separated by observing the form of the parietal barrier. Dr. H. von Ihering has ably discussed the relationships of *H. personata*, ranking it, of course, in *Campylæa*.

H. personata Drap., iii, 147. *H. subpersonata* Midd., iii, 147.

isognomostomos Gm. pt.

v. *debilis* West.

Subgenus TROPIDOMPHALUS Pilsbry, 1894.

Shell with the general characters of *Chilostoma*, but subangular around the umbilicus, and quincuncially punctate or papillate (as in some members of the *H. planospira* group). Type *H. lepidotricha* A. Braun, pl. 71, figs. 59, 60.

The lower Miocene forms for which this section is proposed have the verge of the umbilicus subangular as in most (but not all) *Chloritis* (conf. p. 118) and many species of *Eulota*; and in fact the group may belong to *Eulota* rather than to *Helicigona*. At all events, the closest resemblance is traceable between *H. lepidotricha* and certain southeast Asian *Eulotas*. On theoretical grounds, however, I am disposed to believe that *Eulota* has no extensive past history in Europe, being a recent straggler from East Asia; and this is supported in the main by palæontological evidence.

A thorough study of the Miocene Helices is necessary to determine whether the peculiar sculpture which occurs in so many forms, is a character assumed simultaneously by many subgenera and genera, or an indication of actual genetic relationship. Not much evidence can be adduced in favor of the latter view from the recent fauna, for species of widely different genera exhibit the hairs or papillæ arranged in obliquely decussating series: In *HYGROMIA*, *H. consona*, *lanuginosa*, etc.; in *HELICIGONA*, hairy members of the *planospira* group; in *THYSANOPHORA*, *T. stigmatica* and its allies; in *EULOTA*, numerous oriental species. The list could be indefinitely increased. It will be perceived from this that those authors who insist upon the presence of *Chloritis* in the European Miocene fauna, stand upon narrow and insecure footing.

H. robusta and *trichophora* Reuss., from the lower Miocene of Tuhoric, evidently belong to this group.

Section *Metacampylæa* Pilsbry, 1894.

Shell solid, sublenticular, acutely keeled, the spire obtuse-conic. Aperture oblique, subrhombic; outer and basal lips reflexed, thickened within, the columellar insertion dilated, partly or wholly closing the narrow umbilicus. Surface minutely granulate, and with larger papillæ disposed in quincuncial order. Type *H. rahtii* A. Braun, pl. 71, figs. 45, 46.

In its acute carination, the lower Miocene *H. rahtii* is comparable to *H. lapicida* or *banatica* of the recent fauna, but its sculpture is that of *H. setosa* Zgl. The lip differs somewhat from that of any living "Campylæa," but not more than various species of that group differs from one another. *Metacampylæa* probably stands in much the same relation to *Tropidomphalus* as *Helicigona* (*lapicida*) does to *Chilostoma* (*planospira*, etc.).

H. papillifera Klika and possibly *H. obtusecarinata* Sandb., are to be referred here, but the latter may belong to the ancestral *Tachea* stock.

Subgenus GALACTOCHILUS Sandberger.

Galactochilus SANDB., Land und Süßwasser Conchyl. der Vorwelt, p. 387 (for *H. pomiformis*, *mattiaca*, *ehingensis* and *cornumilitare*).

Shell subglobose, with low, conoid spire of about $4\frac{1}{2}$ whorls, the last large with rounded periphery, subangular around the narrow, partly or nearly closed umbilicus, slowly descending in front. Aperture truncate-oblong, oblique; lip obtuse, expanded on outer and basal margins, dilated at columellar insertion, partly closing the umbilicus. Surface smooth except for growth-striæ. Type *H. ehingensis* Klein, pl. 71, figs. 47, 48.

This group contains several species from the lower Miocene, *H. pomiformis* A. Braun, *Ehingensis* Kl., *mattiaca* Stein. I am disposed to believe it an off-shoot from the "Campylæa" phylum. Some specimens of *H. arbustorum* exhibit much the same subangulation around the umbilical region.

Subgenus MESODONTOPSIS Pilsbry, 1894.

Shell large, depressed, with convex and very obtuse spire and covered umbilicus. Whorls 5, convex, the last ornamented with two

broad bands above and one below the periphery, deflexed in front. Aperture half round, oblique; lip broadly reflexed throughout, dilated and adherent at the columellar insertion. Surface smoothish. Type *H. chaixii* Mich., pl. 71, figs. 61, 62.

This group differs from the pentatæniate *Helices* in having the lip more reflexed, and not forming a columellar plate. I think it allied more to the "Campylæas," with which it agrees in the color pattern (distinctly visible in specimens before me) and the general features of the aperture. I consider *Tacheocampylæa* the most nearly allied group of the recent fauna (conf. pl. 43, figs. 23-35). The resemblance to *Mesodon* is merely superficial. It is likely that *H. brocchii* Mayer from the upper Pliocene belongs here rather than to *Galactochilus*. It is umbilicate and one-banded above; but I have not seen that species, nor *H. ludovici* Noul. and *ornezanensis* Noul. from the Miocene freshwater chalk of southwestern France, which may also find a place in this group. The type, *H. chaixii*, is from the middle Pliocene of Hauterive.

Genus (?) CYRTOCHILUS Sandberger.

Cyrtochilus SANDB., Land u. Süsswasser Conchyl. der Vorwelt, p. 386 (for *H. expansilabris* Sandb.). Not *Cyrtochilus* Jak., 1875, or Meek, 1876, nor *Cyrtochila* Feld, 1874.

Shell globose-conoid, with 5 convex whorls separated by linear sutures, the last whorl large, ventricose, broadly constricted behind the lip; surface of all but first whorl obliquely costulate and decorated with minute papillæ arranged in quincuncial order. Aperture oblique; outer and basal lips expanded, columella narrow, vertical, closing the umbilicus. Type *H. expansilabris* Sandb., pl. 71, fig. 50.

The shell has the figure of *H. platychela* of Sicily, but it is sculptured like a hairy *Chilostoma*. The single species is from the lower Miocene of Hochheim.

Genus HELIX Linné, 1758.

Helix LINNÉ (in part), Syst. Nat., x, p. 768.—LAM., Syst. Anim. s. Vert., 1801, p. 94, *H. pomatia* only. + *Pomatia*, *Tachea*, *Otala*, *Macularia*, *Iberus*, *Eremina*, *Euparypha*, *Hemicycela*, etc., etc.

See for anatomy A. SCHMIDT, Der Geschlechtsapparat der Stylommatophoren in taxonomischer Hinsicht, in Abhandl. naturwis-

senschaftl. Vereins für Sachsen u. Thüringen in Halle, i, pp. 1-52, pl. 1-5, 1856, and Zeitschr. f. Malak., 1850, vii, p. 1-13, pl. 1 (darts); Ibid, 1849, p. 49.—C. BRANCSIK, Sexualapparate einiger Moll. des Trencsiner Comitates in Jahresheft des naturw. Vereins der Trenc. Com., Trencsin, 1890, p. 19-22, pl. 1-3.—R. LEHMANN, Die lebenden Schn. u. Musch. der Umgebung Stettins u. in Pommern, 1873.—MOQ.-TAND., Hist. Nat. Moll. Terr. et Fluv. Fr., 1855.—O. SCHUBERTH. Beitr. zur Vergleich. Anat. des Genitalapparates von *Helix*, in Arch. f. Naturg. lviii, i, 1892, p. 1-65, pl. 1-6.—POL-LONERA, Bull. della Soc. Mal. Ital. xii, 1885, p. 111 (best figs. of dentition).—ERDL, in Moritz Wagner's Reisen in der Regentschaft Algier, 1836.—PAASCH, Archiv f. Naturg., 1843 and 1845.—F, WIEGMANN, Jahrb. d. m. Ges. iv, 1877, p. 195, pl. 6-8.—BAUDELLOT. Ann. Sc. Nat. (4), Zool. xix, 1863.—ASHFORD, Journ. of Conch., Leeds, Vol. iv, 1883-'85.—V. IHERING, Morph. u. Syst. des Genitalapparates von *Helix*, Zeitschr. f. Wissenschaftl. Zool. liv, 1892, p. 386-520.—C. F. JICKEL, Fauna der Land u. Süßwasser Moll. Nord-Ost-Afrika's, in Nova Acta Acad. Cæs. Leop.-Carol. Germ. Nat. Cur. xxxvii, 1875, *et al.* See for palæontology of *Helix*: SANDBERGER, Land- u. Süßwasser-Conchyl. der Vorwelt, with the authorities cited therein; KLIKA, Tert. Land- und Süßwasser-Conch. N. W. Böhmen, (*cf.* BTG., Verh. K.-K. Geol. Reichsanst., 1891, p. 228); PENECKE, Zeitschr. D. geol. Ges. xliii, p. 346; OPPENHEIM, Denkschr. k. Akad. Wissensch. lvii, p. 113 (*cf.* TAUSCH, Verh. K.-K. Geol.-Reichsanst., 1891, p. 198, and de GREGORIO, Ann. de Geol. et de Paléont. 10^e Livr., 1892), etc., etc.

Shell varying from globular to depressed and from rounded to acutely keeled, imperforate or narrowly umbilicated, rather solid, with about 5 whorls; surface striate, ribbed, malleated or granulose. Five-banded, or having fewer or no bands by the absence or coalescence of some or all; rarely having more bands by splitting of bands or interpolation of lines. Lip either expanded, reflexed or thickened within. Type *H. pomatia*, frontispiece, fig. 7, (See pl. 44).

Animal with a tough, granulose or reticulate integument, marked by two or few grooves along back, the tail depressed, with a slight median line or none; *facial grooves well developed on both sides*. Labial processes large; sole undivided. Mantle with a small right body lappet, and a long left one, usually interrupted across the

back. Right eye retractor passing between primary branches of genitalia. (Frontispiece, fig. 7).

Jaw well arched, stout, with 3-9 strong ribs denticulating both margins (pl. 67, figs. 1, 4, 7, 8, 9). Radula normal, having the cusps of median and lateral teeth about as long as the squarish basal plates, side cusps small or wanting. Marginals with a long, oblique bifid inner cusp and a small simple or bifid ectocone (pl. 67, figs. 2, 3, 5, 6, 11).

Genital system characterized by a *short penis passing into the epiphallus, which bears the retractor* (distally inserted on lung floor) and branches into vas deferens and a flagellum, the latter rarely wanting. *One dart sack present* and well developed, containing a *four-bladed dart*, with short neck and crenulated base. *Mucus glands two, varying from simple to multifid, but always composed of smooth, tubular caeca; inserted on each side of vagina immediately above entrance of dart sack; both the dart sack and mucus glands lying free in cavity, not bound together by a stout membrane.* Spermatheca globose, on a long duct, which usually bears a diverticulum. Ovotestis compact, imbedded in the side of the liver (frontispiece figs. 5, 6, *H. pomatia*).

Distribution, Europe, North Africa, Asia Minor.

Helix is distinguished from *Helicigona* mainly by the form of the dart and the *free* diverticulum; this being invariably bound to oviduct by a wide membrane in *Helicigona*.

The genus *Helix* contains the most highly organized and complex snails of the family *Helicidae*. Like the European type of *Homo*, but unlike most highly specialized forms, their specialization has evidently fitted them for meeting widely diverse conditions of existence. Their powers of reproduction as well as the ease with which they adapt themselves to circumstances of climate and environment new to them, are remarkable. They love the light, and for the most part are not exterminated by the destruction of their native forests, but accepting kindly the new conditions, live and multiply in vineyards, gardens and around tilled fields. As colonists they rank with man, the dog and the horse. Various species live and thrive in the United States, Mexico, Cuba, Argentina, S. Africa, New Caledonia, Australia, etc., etc. None, even of the most widely distributed *Helicoids* of other genera such as *Eulota similis*, have so wide a range of climate; and the species of *Helix* which

have founded colonies in climates foreign to them, outnumber the colonized members of all other Helicoid genera together.

The causes of this adaptability are obscure. Perhaps the rather unusual toughness of the external integument and the unrivalled complication of the genitalia are factors of importance, the first allowing them a wider range of station with greater variety and opportunity of feeding, the second producing more perfect eggs. It is noteworthy that the dentition is of a very generalized type, showing no tendency toward the specialization seen in the radulæ of *Polymita*, *Oxychona*, *Papuina*, or the entire series of genera grouping around *Acavus*, *Helicophanta* and *Panda*. Such high modification of dentition as these genera show, must restrict them to the special conditions and food which produced it, and would constitute a bar to their wide dispersal, which is not present in the genus *Helix*. The jaw is of high type, but the same efficient odontognathous form has been developed in many genera.

With the exception of *Euparypha* and *Eremina*, no divisions of *Helix* can be based upon anatomical characters, for the features intergrade throughout, offering merely specific differences. The various "sections" of the genus rest wholly upon conchological characters, which though quite appreciable to the eye, are often extremely difficult to define in words so that they may be distinguished.

The genus *Helix* is abundantly represented in the Tertiary deposits of middle Europe, by species belonging without doubt to the modern groups, although in many cases they are practically intermediate between some of the latter. The HELICOGENA or *Pomatia* group is not known with certainty below Pleistocene deposits, although it is barely possible that the Oligocene *H. globosa* Sowb. belongs here. I do not think this likely; and the evidence at hand indicates that the group arose upon non-European soil, and spread northward or northwest in a few specific forms which have split in comparatively recent times into numerous species. TACHEA, however, has an extensive range in time, a considerable number of forms appearing in lower Miocene deposits, some showing certain features of *Iberus*, others with more conoidal spire than usual in normal recent Tacheas, but still having the characteristic columella and band pattern. *H. bohémica*, *H. moguntina* and *H. hortulana* are examples, being the "Coryda" of some European authors, so-called on account of the trifling incident of a raised spire. Such forms as *H. crepidostoma* Sandb., with keeled earlier whorls, are also to be regarded as

a manifestation of this group. In the upper Miocene, *H. sylvana*, *sylvestrina*, etc., represent this group. In late Pliocene and Post-Pliocene times, Tachea was represented by numerous forms, such as *sepulta* Mich., *tonnensis* Sandb., and those described by Nevill from Mentone. The section OTALA (*Macularia* Auct.) has a similar history, appearing at about the same time, in moderately characteristic forms, many with the malleation of the recent species, as seen in *H. nayliesi*, etc. HEMICYCLA, now confined to the Canary Islands, seems to have had a wide range in the Miocene, some species, such as *asperula* Dh. being excessively similar to recent forms. The isolation of the Canaries has evidently preserved there this ancient race. There are a number of Tertiary forms of Europe known to me by figures or poorly preserved specimens only, which will eventually no doubt form new groups.

H. doderleiniana All. of the Sicilian Pliocene seems to represent a section distinct from *Otala*, although allied to that group, which may be called *Allolæmus*. It is distinguished by the extraordinary expansion of the last whorl toward the aperture, after a wide shallow constriction, causing the throat to be quite narrow, although the mouth is expanded and the outer lip flaring. General form globose-depressed. The specimen before me is from Palermo, collected by Benoit.

It has not been considered necessary to give varietal names to the band variations of these five-banded Helices. They may better be expressed by the well known formula originated by Martens père (Ueber die Ordnung der Bänder an den Schalen mehrerer Land-schnecken, 1832), and explained in the Introduction to this volume.

Synopsis of sections and subgenera.

I. Penis provided with a flagellum.

a. Baso-columellar lip straightened and widened by a callous plate within.

b. Imperforate, globose-conic, periphery round, smoothish ; usually yellow or white, banded *Tachea*.

bb. Imperforate, globose-depressed, periphery round, smooth or malleated, solid ; uniform, or speckled and banded *Otala*.

bbb. Globose-depressed, malleated, ribbed or granulate, dark, usually banded *Hemicycla*.

bbbb. Globose or depressed, smooth or striate, with spotted bands *Iberus* (in part).

aa. Baso-columellar lip concave, not wide or flat.

b. Large, globular; lip simple or expanded *Helicogena*.

bb. Depressed, often keeled, ribbed or striate, 0-4 banded *Iberus* (part); *Levantina*.

II. Penis without flagellum; shell chalky.

a. Globose-depressed, heavy, the lip expanded or thickened; bands few or none *Eremina*.

aa. Globose or depressed, decussated above, the outer lip not in the least expanded, thickened within; bands many, rarely none *Euparypha*.

Section *Helicogena* Férussac, 1819.

Helicogena (part) FERUSSAC, Tab. Syst. Fam. Limaçons, p. 27.—Risso, Hist. Nat. Eur. Mérid., p. 60, first species *H. pomatia*.—CHARPENTIER, Cat. Moll. Suisse, 1837, p. 5, for *H. pomatia* only.—HARTMANN, Gastr. Schw., p. 98 (for *H. pomatia*).—Moq.-Tand., Hist. Nat. Moll. Fr. ii, p. 179.—*Pomatia* Leach, in TURTON'S Manual of the Land and Freshwater Shells of the Brit. Is., 1831, p. 45.—BECK, Index Moll., p. 43, and of authors generally.—? *Lucena*, HARTMANN in Syst. Erd- u. Süsswasser Gastr. Eur., p. 40, 1821.—*Pomacea* PERRY, Conchology, pl. 38, 1811 (in part; but diagnosis agrees better with *Ampullaria* species also included).

Cantareus Risso, Hist. Nat. Eur. Mérid., p. 64, (*Helix naticoides* sole species).—Moq.-TAND., *l. c.*, p. 186.—*Canthareus* AGASSIZ, Nomencl. Zool., 1847.—*Tapada* GRAY, in Turton's Manual L. and Frw. Sh. Brit. Is. edit. 1840, p. 127, *H. aperta* sole species.

Cryptomphalus Agassiz in CHARPENTIER, Catal. Moll. Terrest. et Fluv. de la Suisse, in Neue Denkschriften der allg. Schweizerischen Gesellsch. für die gesammten Naturwissensch. (=Nouveaux Mémoires de la Société Helvétique des Sci. Nat.) i, 1837, p. 5, for *arbus-torum*, *aspera*, *sylvatica*, *nemoralis*.—Moq.-TAND., *l. c.* p. 174, restricted to *H. aspersa*.—*Cavatoria* HELD, Isis, 1837, p. 910, for *aspera*, *lucana*, *lutescens*, *pomatia*, etc.—*Ercella* MONTS., Naturalista Siciliano xiii, No. 9, June, 1894, for *H. mazzullii*.

Shell *globose* or *globose-conoid*, *capacious*, with about $4\frac{1}{2}$ rapidly widening whorls; umbilicus narrow or closed; aperture large, not

very oblique, lunate; outer lip simple or expanded, columella long, concave, not thickened within, its edge reflexed. Type *H. pomatia* L., Frontispiece, fig. 7; (see also pl. 44, figs. 6, 7, *H. asemnis* var. *vetusta*).

Animal large with wide fleshy foot, the sole undivided; above coarsely granose-reticulate; right and left facial grooves strongly marked; labial tentacles well developed; mantle edge bearing a bluntly rounded right body lappet and a similar left one, the latter either continuous or interrupted over the back, but reappearing in a broad rounded lobe on the left side. Top of tail rounded, with a subobsolete median line or none; back from mantle to head with a pair of longitudinal grooves. (Frontispiece, fig. 7, *H. pomatia*). *H. aperta*, *H. aspersa* and other species examined show the same external characters.

Jaw strong, arcuate, with several stout ribs denticulating both margins. Radula (pl. 67, fig. 11, *H. pomatia*) with well developed ectocones on central and lateral teeth; marginals with bifid inner and small simple outer cusps.

Genitalia: Penis short, passing into a short epiphallus upon which the retractor is inserted, the epiphallus ending in a long flagellum and vas deferens. Dart sack unusually large, containing a four-bladed dart, the blades long, separated from the coronated base by a neck or constriction (pl. 61, fig. 11, *aspersa*; fig. 15, *pomatia*). Mucus glands usually divided into several branches subdividing into very numerous fingers, but sometimes (*H. aperta*, *asemnisi*) the number is as low as four or five. Seminal receptacle globular, on a long, nearly straight duct, which usually bears a diverticulum. Hermaphrodite duct much knotted; hermaphrodite gland compact. (Frontispiece, figs. 5, 6, *H. pomatia*, Oberau, Bavarian Tyrol. Pl. 61, figs. 12, 15, *H. pomatia*. Pl. 61, fig. 9, *H. asemnisi*. Pl. 61, figs. 13, 14, 11, *H. aspersa*).

The typical *Helicogenas* agree with the types of *Otala* and with *Tachea vindobonensis* in having the mucus glands divided and subdivided into many "fingers"; but as in *Otala* and *Tachea*, this is an inconstant feature, the number being 4 or 5 in some species. The main character of the group is its globose shell, and this offers a perfectly tangible sectional feature. The dart sack is larger than in the related sections except *Tachea*. There is usually a diverticulum developed on spermatheca duct, but in *H. pomatia* and some other species it is generally absent.

It has been considered best to revert to Férussac's name *Helicogena* for this group, as the well known name *Pomatia* must in any case be abandoned in favor of *Cantareus*, properly proposed five years earlier. *Pomatia*, moreover, is etymologically identical with *Pomatias*, the name referring to the calcareous epiphragm, and not of latin derivation as some have supposed. Strictly speaking, no sectional name is required for this section, as it is the typical group of *Helix*.

The species are European in distribution, but the greater number occur in Southern Europe, Northern Africa and Asia Minor. *H. aspersa* is the most widely dispersed, and has become colonized in many localities in both North and South America, as well as in Australia, etc. Most species of this group are edible and used for food in the latin countries as well as in Turkey, Greece and the Orient.

(I. *Imperforate, solid, malleated, lip expanded throughout; epiphragm membranous*, CRYPTOMPHALUS).

H. aspersa Müll., iv, 235.

grisea Gmel.

variegata Gmel.

H. aspersa.

secunda Da C.

fluminensis Lang.

Thin, plicate or striate, lip hardly expanded, *Eretella*.

H. mazzullii Jan., iv, 235.

crispata Costa not Fér.

retirugis Mke. (undescri.).

rugosa Mühlf.

costæ Ben.

f. zonata Bgt.

v. quincayensis (Maud.) Bgt.

quincianensis Mauduyt.

H. vermiculosa Morel. iv, 149.

f. cretacea Westerl.

H. subaperta Ancey.

mazzulopsis Anc., viii, 238.

H. subplicata Sowb., iv, 236.

H. tristis Pfr., iv, 254.

cerasina Sh.

H. aggerivaga Mab., iv, 255.

II. *Imperforate or umbilicated, the lip hardly expanded; epiphragm rigid, calcareous*, HELICOGENA.

Thin, globular, imperforate and unicolorous, with large aperture and dark coloration, *Cantareus*.

H. aperta Born, iv, 254.

terrestris Forsk.

neritoides Ch.

naticoides Drap.

Southern France to Greece, N. Africa.

v. korægælia Bgt., Loc.

v. kalaritana Prunn., Villa.

Shell strong, often umbilicate, usually banded. *Helicogena*.

- H. pomatia* L., iv, 236.
antiquorum Lch.
pomaria & *scalaris* Müll.
 v. *gesneri* Hartm., iv, 237.
pyrgia Bgt.
 v. *rustica* Hartm., iv, 237.
radiata Ulic., iv, 238.
 v. *pulskyana* Haz., iv, 237.
 v. *sabulosa* Haz., iv, 237.
 v. *hajnaldiana* Haz., iv, 237.
 v. *compacta* Haz., iv, 237.
 v. *solitaria* Haz., iv, 237.
ensarcosoma Serv.
 v. *piceata* Gredl., iv, 237.
brunnea Porro.
 v. *lednicensis* Branc., iv, 238.
 v. *thessalica* Bttg., iv, 238.
 v. *lagarinæ* Adami, iv, 238.
 v. *pyrgia* Bgt.
 v. *segalaunica* Sayn.
 v. *promæca* (Bgt.) Loc.
 v. *gratiosa* Gredl.
H. buchii Dub., iv, 238.
abichiana Bayer.
H. leucorum L., iv, 239.
mutata Lam.
 v. *yleobia* Bgt.
 v. *virago* Bgt.
depressa Bgt.
 v. *ryparia* Bgt.
 v. *nigrozonata* Bgt.
 v. *atrocincta* Bgt.
 v. *anaphora* West.
 v. *castanea* Oliv., iv, 239.
mahometana Bgt.
 v. *euphratica* v. Mts., iv, 240.
 v. *rumelica* Mouss., iv, 240.
 v. *onixiomiera* Bgt., iv, 240.
 v. *elongata* Bgt., iv, 240.
 v. *straminea* Brig., iv, 240.
f. straminiformis Bgt.
 v. *taurica* Kryn., iv, 241.
H. radiosa Ziegl., iv, 241.
H. schlæflii Mouss., iv, 241.
 v. *præstans* Bl. & W.
H. secernenda Rm., iv, 242.
 v. *insignis* Branc.
H. valentini Kob., viii, 239.
H. ligata Müll., iv, 242.
? annularis Perry.
decussata Parr.
melissophaga Costa.
varians Ziegl.
f. pomatella Tib., iv, 243.
f. prætutia Tib., iv, 243.
f. campana Tib., iv, 243.
f. delpretiana Paul., iv, 243.
f. truentina Masc., iv, 243.
f. pseudopomatia Bl., iv, 244.
f. rupicola (Bl.) West.
 v. *albescens* Jan., iv, 244.
 v. *interamnensis* Bgt.
 v. *dichromolena* Bgt.
 v. *gussoneana* Sh., iv, 243.
H. ambigua (Parr) Mss., iv, 244.
cyrtolena Bgt.
f. clathrata West.
 v. *aetolica* Kob., viii, 239.
acarnanica Kob.
 v. *thiesseana* Kob., iv, 244.
H. anctostoma Mts., iv, 244.
beilanica West.
H. cincta Müll., iv, 245.
lemniscata Brum.
dalmatica Mühlf.
 v. *pollinii* DaC., iv, 245.

- v. *calabrica* Kob., iv, 243.
 albescens Adami.
 v. *trojana* Kob.
 v. *anatolica* Kob.
 v. *cypria* Kob.
 H. *asemnisi* Bgt., iv, 245.
 solida Ziegl.
 v. *homerica* Mart., viii, 239.
 v. *venusta* Mart., pl. 44, f. 6,
 7.
 H. *moabitica* Goldfuss.
 H. *melanostoma* Drap. iv, 246.
 f. *pachypleura* Bgt.
 f. *vittata* Rm., iv, 245.
 pronuba West.
 f. *candida* Rm., iv, 247.
 rugosa Ant.
 f. *nupta* West.
 v. *nucula* Parr., iv, 247.
 v. *cathara* West.
 v. *giuliae* Bgt.
 v. *uticensis* (Bgt.) Péch.
 v. *melanonixia* Bgt.
 H. *figulina* Parr., iv, 247.
 v. *pomacella* Parr., iv, 247.
 H. *pachya* Bgt., iv, 248.
- v. *texta* Mouss., iv, 248.
 v. *dehiscens* Westerl.
 pachya Kob., Icon., f. 1031,
 not Bgt.
 H. *pathetica* Parr., iv, 248.
 H. *socia* Rm., iv, 248.
 H. *philibinesis* Friv. Rm., iv, 249
 philibensis Pfr.
 H. *nilotica* Bgt., iv, 249.
 H. *vulgaris* Parr., iv, 249.
 obtusata Ziegl., preoc.
 obtusalis Mouss.
 f. *vallionis* Ret.
 v. *bicineta* Dub., iv, 250.
 H. *lutescens* Ziegl., iv, 250.
 cinerascens Andr.
 H. *nordmanni* Parr., iv, 257.
 H. *raddei* Bttg., iv, 251.
 H. *christophi* Bttg., iv, 251.
 H. *prasinata* Roth, iv, 252.
 H. *cavata* Mouss., iv, 252.
 H. *engaddensis* Bgt., iv, 253.
 H. *pyenia* Bgt., iv, 253.
 H. *godetiana* Kob., iv, 253.
 luteocava Mouss.
 H. *malzani* Kob., iv, 254.

H. equitum, *luynesiana*, *jauberti*, *edroea*, *schahbulukensis* Bgt.,
 (iv, p. 256) are unfigured and insufficiently known forms.

Section *Tachea* Leach, 1831.

Tachea Leach, TURTON, Manual of the Land and Freshwater
 Shells of the British Is., 1831, p. 33 (*nemoralis* and *hortensis*).—
 HARTMANN, Erd- u. Süßwasser-Gasterop. Schweiz, pp. 24, 189, 212,
 1840.—*Helicogena* (part) FERUSSAC, BECK, etc.—*Cepaea* HELD.,
 Isis, 1837, p. 910.—*Archelix* (second section) ALB., Die Hel., 1850,
 p. 98.

Shell imperforate, globose or subdepressed, with low-conoid spire
 and rounded periphery; bright colored, usually yellow, with five
 dark bands, any or all of which may be absent. Whorls 5, the last

deflexed in front, tumid. Aperture wide-lunar, oblique; lip expanded and thickened within, the baso-columellar margin straight, widened by a blade-like callus within, flattened and adnate. Surface smoothish. Type *H. nemoralis* L., pl. 44, figs. 4, 5.

Animal showing a pair of longitudinal grooves on back and indistinct right and left facial grooves, elsewhere coarsely granular; sole very indistinctly tripartite; mantle-edge with small right and minute left body-process on each side of breathing pore.

Jaw (pl. 67, fig. 1, *H. nemoralis*, Würzburg) solid, arcuate, with 4-6 strong ribs grouped in the median part and denticulating either margin. Radula having the middle cusps only developed on central and lateral teeth, the side-cusps represented by a slight lateral wave, but in some forms they are present and minute. Marginal teeth having the inner cusp long, oblique and bifid, outer cusp small, simple (pl. 67, figs. 2, 3, *H. nemoralis*).

Genitalia: penis long, bearing a long flagellum; duct of spermatheca very long and usually with a diverticulum. Dart sack muscular, containing a four-bladed dart, with conspicuously coronated base and long head, the blades split in some species. Mucus glands two, inserted on opposite sides of vagina immediately above *d. s.*, each subdivided into several long, slender cylindrical finger-like caeca (pl. 63, fig. 12, *H. nemoralis*).

Distribution, entire Europe.

Tachea is one of the most conspicuous and characteristic forms of European snail life. They live on bushes and walls, in gardens, vineyards, etc., and, while avoiding the direct rays of the sun, are light-loving creatures. They colonize freely, *H. nemoralis* increases rapidly where introduced in America. *H. hortensis* inhabits many of the islands off the New England coast, and being found in pre-Columbian kitchen-middling deposits, cannot be regarded as a recent immigrant. Possibly it may be the sole survivor of that Viking incursion in the eleventh century.

The variations of the Tacheas are mostly in coloring, and it has not been considered worth while to give below the multitude of names founded on band-variations, etc. There is considerable variation in the size of dart sack, and in the darts of various species, as well as in the number of fingers of the mucous glands, which are generally quite long (15-16 mill. in *nemoralis*, *splendida*, *coquandi*, 29 in *vindobonensis*), and vary from four in each group in *nemoralis* to from 16 to 30 in *vindobonensis*.

- | | |
|---------------------------------|-------------------------------------|
| H. atrolabiata Kr., iv, 124. | H. hortensis Müll., iv, 123. |
| <i>calligera</i> Dub. | <i>subglobosa</i> Binn. |
| v. stauropolitana Schmidt. | H. sylvatica Dr., iv, 125. |
| v. leucoranea Mousson. | v. montana Stud. |
| v. pallasii Dubois. | v. rhenana Kob. |
| v. decussata Boettger. | ? v. litturata Pfr., iv, 126. |
| v. intercedens Retowski. | <i>"litturea,"</i> iv, 126 (err.). |
| v. nemoraloides Martens. | H. coquandi Mor., iv, 125. |
| H. vindobonensis Fér., iv, 124. | f. nemoraloides Kob. |
| <i>austriaca</i> Mühl. | f. nahoni Kob. |
| <i>mutabilis</i> Hartm. | f. ellioti Kob. |
| <i>arvensis</i> Kryn. | f. depressa Kob. |
| H. subaustriaca Bgt. | H. splendida Drap., iv, 147. |
| H. nemoralis Müll., iv, 122. | f. roseolabiata Rm. |
| f. pura West., Verh. k. k. | v. cossoni Let., iv, 148. |
| z.-b. Ges., '92. | v. calæca Fag. |
| v. erjavecii Kobelt. | H. aimophila Bgt., iv, 126. |
| v. lucifuga Hartm. | v. tchihatcheffi Kob., iv, 126. |
| <i>appenina</i> Stabile. | v. aimophilopsis Villes, iv, 126. |
| <i>genuensis</i> Porro. | H. vicaria West., Nachr., 1894, 168 |

(*Quaternary fossil species from Mentone.*)

- | | |
|------------------------------|----------------------|
| H. paretiana Issel, iv, 130. | H. mentonica Nevill. |
| <i>monacensis</i> Ramb. | H. bennetiana Nev. |
| H. ædesima Nev. | H. williamsiana Nev. |
| v. colorata Nev. | v. subnemoralis Nev. |
| v. crassior Nev. | v. spanias Nev. |

Two species described by Deshayes are referred to this group by Pfeiffer. H. gibbosula Desh., iv, 126, and H. filosa Desh., iv, 126. Their localities are unknown, and subsequent authors have not identified them.

Section *Otala* Schumacher, 1817.

Archelix ALB., Die Hel., 1850, p. 14, 21, 98 (exclusive of section *b*).—*Macularia* MARTENS Die Hel., 1860, p. 132, and of authors generally, not *Macularia* Albers, 1850.—*Helicogena* in part of Férussac, Risso, Beck, et al.—*Otala* SCHUM., Essai d'un nouv. Syst., p. 191 (for *hæmastoma*, *atomaria* = *lactea*, *sulcata* = *Plicadomus*).—MOQ.-TAND. (in part), Hist. Nat. Moll. Fr., ii, p. 142.—Not *Otala* Beck, 1837, Index, p. 35.

Shell depressed-globose, imperforate, solid, somewhat cretaceous; white, unicolored or banded, a five-banded pattern usually traceable. Surface usually finely malleated. Last whorl rounded at periphery, deeply deflexed in front. Aperture very oblique, truncate-oval, the outer lip expanded and thickened within, baso-columellar lip straightened, reflexed and adnate, widened by an internal callus. Type *H. lactea* Müll., pl. 44, fig. 11 (see also pl. 44, figs. 9, 10, *H. vermiculata*).

Animal externally like *Tachea*.

Jaw arcuate with blunt ends and 4 to 7 strong, convex ribs dentating both margins (pl. 67, fig. 4, *H. vermiculata*). Radula similar to that of *Tachea*, side cusps being developed in some species, absent in others (pl. 67, fig. 5, *H. vermiculata*).

Genitalia (pl. 63, fig. 8, *H. vermiculata*) similar to *Tachea*, but in the typical species the mucus glands are split into a great number of caeca, as in *Pomatia*. Dart coronated at base, with four blades, which may be either simple (*H. alonensis*, pl. 63, fig. 13) or divided (*H. vermiculata*, pl. 63, fig. 5). In the group of *H. alonensis*, *balearica*, *minoricensis*, etc., the mucus glands have few fingers, as in *H. (Tachea) nemoralis*.

Distribution, southern Europe, Northern Africa, Canary Islands.

This section differs from *Tachea* in the more compact, solid shell with generally a more deflexed last whorl and irregular color-pattern. It presents no constant anatomical difference from *Tachea*, but in most species the fingers of the mucus glands are more numerous.

The name *Otala* was proposed for three species, placed in two sections. Section *a* contained *haemastoma* (which, being the type of a prior genus, must be eliminated, see *ant.* p. 153), and *atomaria*, a new name for *lactea* Müll. Section *b* contained the *Helix sulcata* of Müller, a form which Swainson, in 1840, made the type of his group *Plicadomus*. These eliminations leave *H. lactea* the valid nucleus of Schumacher's group, and this name should have been adopted by Albers in 1850; but, instead, he coined a new one—*Archelix*. This name was dropped in Marten's edition of *Die Heliceen*, 1860, and the species placed in *Macularia*, a group originally proposed by Albers for the spotted and unkeeled *Iberus*, and which did not originally contain the species *vermiculata*, which Martens names as its type! As the the type of *Macularia* had been expressly said to

be *niciensis* by Lowe in 1854, Martens action clearly cannot be sustained; and, unless we use the name *Otala* for this group, it must be called *Archelix*. Beck's use of *Otala* has no bearing upon the case, as he included none of Schumacher's species in his group.

- H. vermiculata* Müll., iv, 128.
 muraloides Chier.
 v. *thalassina* Porro.
 v. *grimaldiensis* Nev.
 v. *uticensis* Kob.
 v. *gaidurina* Bl. & W.
 v. *saharica* Kob., iv, 128.
 v. *linusina* Ben.
 linusæ Calc.
 v. *subangulata* Iss., iv, 129.
 v. *pelogosana* (Stoss.) West.
H. punica Morel., iv, 129.
H. constantinæ Fbs., iv, 129.
 cirtæ Terv.
 v. *fleurati* Bgt., iv, 129.
H. boghariensis Deb., iv, 129.
H. lactea Müll., iv, 130.
 irrorata Say.
 atomaria Schm.
 f. *bertheri* Bgt. (albino).
 v. *ezquerriana* Bgt.
 v. *turturina* (Guirao) Rm.
 v. *maura* (Guirao) Rm.
 simocheila (Bgt.) Serv.
 v. *sevillensis* Serv.
 v. *sevilliana* (Grat.) Mss.
 v. *murcica* Rm.
 v. *axia* Bgt.
 v. *malacensis* Anc.
 v. *bleicheri* Palad. iv, 132.
 stomatodæa Bgt.
 v. *ibrahimi* Bgt.
 v. *sphæromorpha* Bgt.
 v. *plesiasteia* Bgt.
 v. *bathylæma* Bgt., iv, 130.
 v. *alybensis* Kob., iv, 130.
 v. *tagina* Serv., iv, 130.
H. gibbosobasalis Woll., iv, 131.
H. atavorum Mab., iv, 131.
H. ahmarina (B.) Mab., iv, 131.
H. punctata Müll., iv, 131.
 myristigmæa (Bgt.) Péch.
 f. *galena* (Bgt.) Péch.
 v. *punctatissima* Jen.
 v. *bredeana* Deb.
 v. *apalolena* Bgt., iv, 132.
H. tingitana Pal., iv, 132.
H. lucasi Dh., iv, 132.
H. ghazouana Deb., iv, 133.
H. hieroglyphicula Mich., iv, 133.
 oranica Bgt.
 f. *integrivittis* Anc.
H. alabastrites Mich., iv, 134.
 soluta Mich.
 v. *pynochilia* Bgt.
H. atlasica Mouss., iv, 134.
H. aleyone Kob., iv, 134.
H. juilleti Terv., iv, 134.
 chottica Anc.
 saidana Deb.
 v. *marguerittei* (B.) Pch.
 v. *heliophila* (B.) Pch.
H. bailioni Deb., iv, 135.
H. denansi Kob., iv, 135.
H. beguirensis Deb., iv, 135.
 beguirana Auct.
H. wagneri Rossm., iv, 136.
H. charieia Pech., iv, 136.
H. jourdaniana Bgt., iv, 136.
H. arichensis Deb., iv, 137.
 v. *crassidens* Deb., iv, 137.
 v. *catodonta* (B.) Pech.

- v. lobethana Deb., iv, 137.
H. zaffarina Terv., iv, 137.
v. zelleri Kob., iv, 138.
f. doubletti Bgt.
H. anoterodon Péch., iv, 138.
H. dupotetiana Terv., iv, 138.
H. brevieri Péch., iv, 139.
dupot. v. aspera Gass.
v. rugosa Kob.
euglyptolena Bgt.
v. subbrevieri Bgt.
H. xanthodon Ant., iv, 139.
v. ema Bgt.
v. pseudoembia Bgt., iv, 141.
H. arabica Terv., iv, 139
v. abrolena Bgt.
H. odopachya Bgt., iv, 140.
H. bonduelliana Bgt., iv, 140.
v. asteia Bgt.
H. leucochilops Pils., iv, 240.
leucocheila W., not Cox.
H. senilis Morel., iv, 140.
H. subsenilis Cr.
H. embia Bgt., iv, 140.
H. burini Bgt., iv, 141.
H. tigri Gerv., iv, 141.
tigriana Bgt.
maresi Cr.
v. stereodonta Bgt.
v. dicallistodon Bgt.
H. surrodonta Bgt., iv, 142.
H. dastugui Bgt., iv, 142.
H. subjobæana Kob., iv, 142.
H. jobæana Cr., iv, 142.
H. beaumieri Mouss., iv, 149.
H. raymondi Moq., iv, 149.
desfontanea Morel.
H. efferata Mouss., iv, 145.
H. moussoniana Woll., iv, 145.
adonis Mouss., not Ang.
H. alonensis Fér., iv, 146.
f. lorcana Rossm.
v. carthageniensis Rossm.
v. campesina Ezq.
v. bajoï (Bgt.) Serv.
v. loxana Rossm.
H. alcarazana Guir., iv, 147.
H. guiraoana Rossm., iv, 147.
v. augustata Rossm., iv, 147.
H. ebusitana Hid.
H. marmorata Fér., iv, 147.
exornata Parr.
v. menobana (Bgt.) Péch.
v. violacea Rossm.
pulehella Rm.
partschii Bgt.
H. balearica Ziegl., iv, 148.
hispanica Partsch.
speciosa Ziegl.
f. valdemusana Bgt.
f. eustrapa Bgt.
v. companyonii Aler. iv, 148.
companyoi West.
pyrenaica Rossm.
v. palmana (Berth.) Bgt.
H. minoricensis Mitt., iv, 148.
minorica (Berth.) B.
f. sampoli (Bgt.) Péch.
H. massylæa Morel., iv, 144.
v. zenatia Kob., iv, 144.
H. prædisposita Mss., iv, 145.
H. rereyana Mss., iv, 145.
H. codringtoni Gray, iv, 143.
ferussaci C. & J.
euclincta Bgt.
euchromia Bgt.
eupæcilia Bgt.
v. pseudoparnassia Mss.
v. lycica Mart.
v. callirhoë Rolle.

- | | |
|---|---------------------------------------|
| subsp. <i>parnassia</i> Roth., iv, 143. | <i>blanci</i> Bgt., mss. |
| subsp. <i>oetæ</i> Kob., iv, 143. | v. <i>pantocratis</i> Broem. |
| <i>f. alba</i> Kob. | v. <i>coracis</i> Kob. |
| v. <i>ætolica</i> Bttg., iv, 143. | subsp. <i>intusplicata</i> Pfr. viii, |
| subsp. <i>crassa</i> Pfr. iv, 144. | v. <i>subangulata</i> Kob. [240. |

Unfigured and imperfectly known species or forms of Otala.

H. miloni, *parisotiana*, *hermieri*, *chydopsis*, of (Bgt.) Péchaud. *H. ramisi*, *catharolena*, *toukriana*, *galiffetiana*, *eugastoria*, *bandotiana*, *agenna*. *lucentumensis*, *acanonica*, *nitefacta*, *sticta*, *azorella*, *lampri-mathia*, *takredica*, *romalea*, *brocha*, *seignetti*, Bgt. *H. cantæ chorista*, *tiranoi* (Bgt.) Serv. *H. æcouria*, *mattarica* Let & Bgt. *H. seguyana*, *acatergastra*, *speiratopa*, *bouthyana*, *alabastra* Péchaud. *H. duriezi* Deb. *H. flattersiana* Anc.

Section *Hemicycla* Swainson, 1840.

Hemicycla SWAINSON, *Malacology*, p. 331, type *H. plicaria* Lam. —*Myccena* Alb., *Die Hel.*, 1850, p. 123. — *Cochlea* (part) ADANSON *et al.*

Shell imperforate or umbilicate, globose-depressed, solid and opaque; 5-banded, but the number frequently reduced by the absence of band v or the coalescence of bands ii and iii, sometimes all bands obsolete. Surface strongly striate, decussated or *malleated*. Whorls $4\frac{1}{2}$ to 6, the last deflexed in front. Aperture very oblique; lip reflected throughout, thickened within, the baso-columeller margin wider, usually flattened and appressed, often obliquely toothed. Young shells angular or keeled. Type *H. plicaria* Lam., pl. 43, fig. 43 (see also pl. 43, fig. 44, *H. sauleyi* Orb.). Anatomy unknown.

Distribution, Canary Islands. Although the anatomy of this group is still unknown, the close correspondence of its shell to *Otala* renders its systematic position moderately certain. The soft parts will probably prove the same as in other pentatæniate snails, unless an earlier stage of development be retained in fewer-branched mucus glands. The Canary Island fauna is much less individualized than that of the Madeira, Azores and Cape Verde groups, and in its *Helices* it seems much more nearly allied to that of the Mediterranean tract. The number of species will probably be somewhat reduced by more critical study of their variations.

- H. plicaria* Lam., iv, 151.
plicatula Lam.
orbiculata Wood.
planorbula Gray.
H. chersa Mab., iv, 153.
H. benthencourtiana Sh., iv, 151.
H. sarcostoma W. & B., iv, 152.
 v. thaumalea Mab., iv, 152.
H. paeteliana Sh., iv, 152.
H. bathycoma Mab., iv, 153.
H. eucalypta Mab., iv, 154.
H. sabiniana Mab., iv, 154.
H. zelota Mab., iv, 154.
H. ephedrophila Mab., iv, 155.
H. themera Mab., iv, 155.
H. riprochi Mab., iv, 155.
H. janthina Mab., iv, 156.
H. gravida Mouss., iv, 156.
H. bathycampa Mab., iv, 157.
H. subgravida Mab., iv, 157.
H. barekeriana Mab., iv, 157.
H. cacopista Mab., iv, 158.
H. cateucta Mab., iv, 158.
H. justini Mab., iv, 159.
H. helygaia Mab., iv, 159.
H. cacoplasta Mab., iv, 159.
H. callipona Mab., iv, 160.
H. perrieri Mab., iv, 160.
H. verneui Mab., iv, 161.
H. idryta Mab., iv, 161.
H. hedonica Mab., iv, 161.
H. galdarica Mab., iv, 162.
H. ledru Mab., iv, 162.
H. ethelema Mab., iv, 163.
H. agaetana Mab., iv, 163.
H. sauleyi Orb., iv, 164.
 v. temperata Mss., iv, 164.
H. baia Mab., iv, 164.
H. embritha Mab., iv, 165.
H. crypsidoma Mab., iv, 165.
H. stulta Mab., iv, 165.
H. carta Mab., iv, 166.
H. retrodens Mouss., iv, 166.
H. pouchet Fér., iv, 167.
 adansonii W. & B.
H. desculpta Mouss., iv, 167.
H. modesta Fér., iv, 167.
 paivana Lwe.
H. idiotrypa Mab., iv, 168.
H. malleata Fér., iv, 168.
 bidentalis Lam.
 v. nivariæ Woll., iv, 169.
H. glasiana Sh., iv, 169.
 pellislacerti Rv.
H. glyceia Mab., iv, 170.
H. empeda Mab., iv, 170.
H. fritschi Mouss., iv, 170.
H. consobrina Fér., iv, 171.
 v. vetusta Mouss.
H. evergasta Mab., iv, 171.
H. cacopera Mab., iv, 172.
H. bathyclera Mab., iv, 172.
H. thanasima Mab., iv, 173.
H. ephora Mab., iv, 173.
H. cardiobola Mab., iv, 173.
H. guamartemes Grass., iv, 174.
 manriquiana Lwe.
 guartemes Martens.
H. invernica Mouss., iv, 174.
H. maugeana Sh., iv, 175.
 gaudryi Rv.
H. distensa Mouss., iv, 175.
H. hedybia Mab., iv, 176.
H. perraudierei Grass., iv, 176.
H. hierroensis Grass., iv, 176.
 valverdensis Lwe.
H. indifferens Mouss., iv, 177.
H. gaudryi Orb., iv, 177.
 v. evergeta Mab.
 v. gaudryopsis Mab.



- | | |
|----------------------------------|----------------------------------|
| H. granomalleata Woll., iv, 178. | H. quadricincta Morel., iv, 182. |
| H. vermiplicata Woll., iv, 178. | H. berkeleii Lwe., iv, 186. |
| H. amblasmodon Mab., iv, 179. | H. saponacea Lwe., iv, 183. |
| H. zorgia Mab., iv, 179. | H. psathyra Lwe., iv, 183. |
| H. planorbella Lam., iv, 180. | H. thespesia Mab., iv, 183. |
| <i>villiersii</i> Orb. | H. bituminosa Mab., iv, 184. |
| v. incisogranulata Woll. | H. merita Mouss., iv, 185. |
| H. inutilis Mouss., iv, 181. | H. harmonica Mouss., iv, 185. |
| H. plutonia Lwe., iv, 181. | H. gomerensis Morel., iv, 185. |
| H. semitecta Mouss., iv, 181. | H. thoryna Mab., iv., 185. |
| H. paivanopsis Mab., iv, 182. | H. hedeia Mab., iv, 186. |
| <i>paivana</i> Morel., not Lwe. | H. digna Mouss., iv, 186. |

Section *Iberus* Montfort, 1810.

Iberus MONTF., Conch. Syst. ii, p. 146, type *I. gualterianus*.—*Euiberus* WESTERL. Fauna Paläaract. Binnenconch., Helix, p. 367, 1889, same type.—*Macularia* ALBERS, Die Hel. 1850, p. 80.—LOWE, P. Z. S. 1854, p. 166, type *H. niciensis* Fér.—H. & A. AD., Gen. Rec. Moll. ii, p. 210. Not *Macularia* of v. Martens and subsequent authors.—*Murella* PFR., Mal. Bl. xxiv, p. 8, proposed for *H. serpentina*, *surrentina*, *theresæ*, *strigata*, *carseolana*, *melitensis*, *provincialis*, *muralis*.—MONTS., Moll. Terrest. della Isole adiacenti alle Sicilia, p. 32, 33, restricted to group of *H. serpentina*.—*Transiberus* MONTS., Moll. Terrestri, etc., (in Atti della R. Accad. di Scienze, Lettere e Belle Arti (3) ii), p. 33, 1892; proposed for Sicilian *Iberus*.

Shell rather cretaceous, imperforate or partly covered perforate, varying from depressed or lens-shaped to globular; solid, smooth or wrinkled, with 0 to 5 spiral bands. Last whorl rounded or keeled, deflexed in front. Aperture very oblique, subovate. Lip expanded on outer and basal margins and thickened within; columellar lip reflexed, dilated toward insertion. Type *H. gualtierana* L., pl. 44, fig. 8. See also pl. 44, fig. 15, *H. scabriuscula*; figs. 16, 17, *H. muralis*; fig. 18 *H. sicana*.

Jaw (pl. 67, fig. 7 *H. serpentina*) with 3–6 ribs, denticulating the margins. Sometimes the ribs are almost obsolete. Radula characterized by the lack of side cusps on central and lateral teeth, the middle cusps being about as long as the basal plates. Marginals with a long bifid inner cusp and small simple or bifid ectocone (pl.

67, fig. 6 *H. serpentina*). Genital system (pl. 61, fig. 8 *H. gualtierana*; pl. 61, figs. 6, 7, *H. muralis*; pl. 63, fig. 1, 2, 3, *H. serpentina*). Penis rather short, the retractor and epiphallus inserted at its apex, epiphallus ending in a moderately long flagellum. Spermatheca globular, on a long duct which bears a diverticulum. Dart sack as in *Otala*. Mucus glands two, simple, or each dividing into two or three branches. Dart four-bladed, with expanded, feebly crenulated base (pl. 63, figs. 1, 2, *H. serpentina*).

The anatomy of *Iberus* is like that of *Otala* except in the fewer fingers of the mucus glands. In this respect, both *Tachea*, *Helicogena* and *Otala* exhibit great variation; and the same is true of *Iberus*. It is perfectly clear that no characters whatever, for the separation of these groups, can be obtained from the soft anatomy. They rest wholly upon conchological characters. The dart is not of the typically four-bladed type in some species, although it is in *H. gualtierana*. In *serpentina* it seems more like a modified two-bladed form.

The group *Iberus* was originally proposed for *H. gualtierana* only, so that Westerlund's name *Euiberus* seems to me wholly superfluous. The next published name for the group was *Macularia* of Albers, proposed for the species with rounded periphery and spotted bands. Albers selected no type from his list, but in 1854 Lowe named *H. nicensis* as the type. The name *Macularia* was used for the species of Albers original list by Mörch (Catal. Yoldi, 1852), by H. & A. Adams (Gen. Rec. Moll. 1855) and others, so that both by the formal selection of a type from the original list of species, and by usage in well-known publications, the name became fixed. It was, therefore, directly contrary to the fundamental principles of nomenclature for Albers-Martens in the second edition of *Die Heliceen* (1860) to shift the name to the group of *H. vermiculata*; and although this unlawful usage has been followed by all later authors to this day, it is too obviously unjustified to stand longer uncorrected. As to the synonymy of the other sectional names, it would seem that in the absence of characters their discussion is not worth the ink it would cost.

Bourguignat believes that the north African group of globose *Iberus*, such as *H. sicanoïdes*, is a modification of the *H. raymondi* stock (Bull. Soc. Mal. Fr. i, p. 7).

- I. *Iberus* s. str. Keeled and depressed, coarsely latticed.
Mucous glands several-branched.

f. undulata Kob., iv, 207.

- f. achatina* Ben., 207.
f. saracena Ben.
 v. tarentina Kob., iv, 207.
 v. latilabris Westerl.
 II. *rollei* Malz., viii, 236.
 H. *arista* Westerl.
 H. *caltabellotensis* Kob., viii, 232.
 H. *talamonica* Kob., viii, 231.
 H. *tiberiana* Ben., iv, 206.
 H. *muralis* Müll., iv, 205.
 abromia Bgt.
 v. rugosa Ziegl., iv, 205.
 v. costulata Ben., iv, 205.
 v. crispata Ben., iv, 206.
 v. alutacea Paul., iv, 206.
 v. insularis Ben., iv, 206.
 v. undulata Mich., iv, 206.
 communis Ben.
 orgonensis Philb.
 v. abrea (Bgt.) Mab.
 v. ciofaloi Cafic.
 v. messanensis Suliotti.
 v. substrigata (Bgt.) Mab.
 H. *eugenia* Pfr., iv, 221.
 vigenia Parr.
 calypso Ben.
 v. huetiana Ben., iv, 221.
 hueti Pfr.
- III. *Macularia* Alb. Mucus glands two or three-branched at ends; dart peculiar. Depressed species: mainly Italy, Sardinia and Corsica.
- H. *niciensis* Fer., iv, 214.
 nicaensis Rissor.,
 v. faudensis Suliotti.
 v. clairi Bgt.
 H. *oberndoerferi* Kob., iv, 217.
 ? *halmyris* Mab.
 ? *v. tylota* Westerl.
 H. *serpentina* Fér., iv, 214.
 v. isilensis (V.) Paul., iv, 215.
 v. jaspidea Mab., iv, 215.
 marmorellata Mab.
 v. trica Paul.
 v. velancia Mab.
 H. *isarae* Paul., viii, 236.
 H. *magnetti* Cantr., viii, 236.
 hospitans Bon., Paul., iv, 215.
 v. alabastrina Paul., iv, 216.
 H. *caræ* Cantr., iv, 216.
 v. orites Westerl.
 v. adjaciensis Paul., iv, 216.
 H. *cenestinensis* Cr. & Deb., iv,
 [216.
 v. suburbana Paul., viii, 236.
 v. pudiosa Paul., iv, 217.
 v. austera W.
 forsythi Kob. Icon., n. f., 508.
 v. villica Paul., iv, 218.
 v. tetrazona Jan., iv, 218.
 picena Tib., iv, 109.
 f. ascoliensis Bgt.
 v. strigata Müll., iv, 218.
 f. posidoniensis Tib., iv, 219.
 f. corrugata Z., Rm. Icon., 229.
 f. polita Paul., iv, 219.
 v. sicula Ben., 219.
 v. umbrica Charp., iv, 218, 224.
 f. moltenii Ad., West.
 v. fuscolabiata Rm., iv, 219.
 v. theresæ (Ben.) Mts., iv, 224.
 v. surrentina Schm., iv, 218.
 f. lucana Bl., West.
 v. saxetana Paul., iv, 224.
 v. mariannæ Kob., iv, 222.
 circumornata Kob., olim.

- | | |
|---------------------------------------|--------------------------------------|
| v. peucetana Kob., iv, 122. | <i>carseolana</i> Auct. |
| v. apula Bl., iv, 219. | <i>marrucina</i> Tib. |
| <i>H. forsythi</i> Paul., iv, 223. | v. recondita West., iv, 220. |
| f. orta Paul., iv, 224. | v. contaminata Paul., iv, 220. |
| <i>H. argentarolæ</i> Paul., iv, 223. | v. uzielliana Paul., iv, 220. |
| <i>H. signata</i> Fér., iv, 223. | v. persianii Tib., iv, 220. |
| <i>circumornata</i> Mts. not Fér. | v. uniarmata Paul., iv, 220. |
| <i>ficuum</i> Mühlf. | v. milettiana Paul., iv, 220. |
| f. virginea Blanc. | <i>H. nebrodensis</i> Prj., iv, 220. |
| <i>H. scherzeri</i> (Zel.) Pfr. | v. silvestrii Cafici, iv, 226. |
| <i>H. carsoliana</i> Fér., iv, 219. | |

Section *Levantina* Kobelt, 1871.

Levantina KOB., Catal. Eur. Binnenconch., p. 19. See for anatomy SCHMIDT, Stylom., pl. 4, f. 21, and SCHUBERTH, Arch. Naturg., 1892, pl. 5, f. 9, 10.

Shell solid, rather cretaceous, large and depressed, the earlier whorls acutely keeled, rendering the sutures rather superficial, last whorl wide, rounded, umbilicate or imperforate, ornamented with 4 or 5 bands of arrow-like spots, or unicolorous whitish, deflexed in front. Aperture ovate-rounded, very oblique; lip expanded, the baso-columellar margin reflexed and dilated. Type *H. guttata*. (See pl. 44, figs. 1, 2, 3, *H. guttata* var. *sesteri*.)

Jaw with 4-6 ribs denticulating the margins. Radula with the middle cusp of the median and lateral teeth wide, about as long as basal plates, no side cusps. Marginals with a long bifid inner cusp and a small ectocone.

Genital system (pl. 61, fig. 10, *H. hierosolyma*) with penis and flagellum as usual in *Otala*. Dart sack rather small; mucus glands 3-branched. Spermatheca duct long, with a long diverticulum. Dart four-bladed.

Distribution, Island of Rhodes and Palestine to the Mesopotamian Desert and Persia.

The anatomy offers nothing separating this group from *Otala* or *Iberus*, but the characteristic shell and the distribution render it convenient to retain the group.

- | | |
|--------------------------------------|-----------------------------------|
| H. spiriplana Oliv., iv, 226. | H. guttata Oliv., iv, 228. |
| v. malziana (Parr.) Pfr., iv, | v. ergilensis Galland. |
| [227. | v. sesteri Gall. |
| v. gallandi Bgt. | v. michoniana Bgt., iv, 229. |
| H. hierosolyma Boiss. | <i>baschkira</i> Pfr. |
| <i>f. masadæ</i> Tristr., iv, 227. | H. mazenderanensis Nev., iv, 229. |
| <i>f. lithophaga</i> Conr., iv, 228. | H. kurdistana Parr., iv, 230. |
| H. cæsareana Parr., iv, 227. | H. ceratomma Pfr., iv, 231. |
| <i>f. maxima</i> Bgt. | H. escheriana Mss., iv, 230. |
| <i>f. carinata</i> Bgt. | <i>f. diarbekirana</i> Gall. |
| <i>f. albidula</i> Bgt. | <i>f. euthyomphala</i> Gall. |
| <i>f. nana</i> Mouss. | H. bellardii Mouss., iv, 231. |
| v. globulosa Bgt. | <i>f. oclusa</i> Mouss. |
| H. werneri Rolle, viii, 236. | H. ghilanica Mss., iv, 231. |
| H. dschulfensis (Dub.) Bgt., iv, | H. urmiensis Naeg., viii, 237. |
| 228. | H. ninivita Gall., viii, 238. |
| <i>dschulfensis</i> Dubois. | H. lapithœensis Rolle. |
| <i>djulfensis</i> Mouss. | H. gertrudis Rolle. |
| | H. chrysostomi Rolle. |

Subgenus (?) PARACHLORÆA Sandberger.

Parachloræa SANDB., Conch. Vorwelt., p. 292, type *H. coquandiana* Mathéron.

Shell imperforate, lens-shaped, acutely keeled. Last whorl deflexed in front. Aperture very oblique, angulate-oval, the margins remote; upper margin of lip slightly expanded, basal margin reflexed and appressed. Type *H. coquandiana* Math.

The type of this group is from the French "Palæotherium chalk" of Oligocene age, but similar forms are found in Eocene and in lower Miocene deposits. The group, whether rightly limited or not, is probably a side branch of the *Helix* phylum. For any one to connect it with *Chloræa*, on account of the keel, seems unjustified in view of the vast variability of this character. The development of a keel in *Helix*, with the consequent modification of shell contour, is a character of the most trivial import. A few of these forms which I have seen, seemed to be keeled manifestations of the *Tachea* group.

Subgenus EREMINA Pfeiffer, 1855.

Eremina PFR., Mal. Bl., 1855, p. 139, sole species *H. desertorum*.—*Eremophila* KOBELT, Katalog Eur. Binnenconch., p. 19, 1871; Iconographie iv, p. 13.—*Erinna* MORCH., Journ. de Conch., 1865, p. 387 (*desertorum*).—*Eremia* Auct.—*Conf.* JICKELI Moll. N.-O.-Afrika's, pl. 1, f. 7-9 (dentition, jaws and darts); SCHUBERTH, Archiv f. Naturg., 1892, pl. 5, f. 11, 12 (teeth and dart).—SEMPER, Reisen im Arch. Phil. Landmoll., pl. 14, fig. 14 (genitalia).

Shell imperforate or narrowly umbilicate, *solid, chalky*, with rudely striate surface; white with reddish bands or suffused and streaked with tawny. Whorls about 5, the last somewhat or not descending. Aperture slightly oblique, wide lunate; lip a little expanded and blunt or greatly thickened, the columellar margin reflexed, *arcuate, not thickened by an internal plate* of callus. Type *H. desertorum* Forsk., pl. 44, figs. 12, 13; also fig. 14, var. *ehrenbergi* Roth, (*chilembia* Bgt.)

Jaw stout, arcuate, with blunt ends; having grouped near the middle two to four strong ribs dentating both margins (pl. 67, fig. 9, *H. desertorum*; fig. 8, *H. desertella*). Radula having basal plates rather short; cusp attaining edge of basal plate, the side cusps obsolete; laterals bicuspid, with a small outer cusp. Marginals having the larger cusp bifid, the ectocone also splitting on the outer ones (pl. 67, fig. 10, *H. desertorum*).

Genitalia: Spermatheca duct long (45 mill.) *with no diverticulum*. Dart sack small, containing a two-bladed dart with serrate crown, and a longitudinal rib or sometimes a blade on one or each side (pl. 63, fig. 6, *H. desertorum*). Mucus glands 2, *long pediceled*, branching into 5 to 6 fine tufted fingers. *No flagellum on penis*, the retractor and vas deferens terminal (pl. 63, fig. 4, *H. desertorum*).

The solid, cretaceous shell and lack of flagellum on the penis ally this group to *Euparypha*; the long-stalked pair of digitate mucus glands and the tendency to be five-banded are points of likeness to *Tachea*. The dart is slightly coronated at base, the head long and two-bladed, but with side ribs which sometimes develop into blades, and it, therefore, is mainly of the type common in *Pentatænia*. A diverticulum on spermatheca duct is wanting, but this feature varies greatly even among closely allied species.

The species are desert forms, inhabiting northeastern Africa.

H. desertorum Forsk., iv, 127, *H. desertorum*.

[261. v. *hasselquisti* Ehr.

maculosa Born.

f. ehrenbergi Roth.

irregularis Fér.

chilembia Bgt.

forskali Ehr.

v. *hemprichi* Ehr.

arabica Roth.

v. *aschersoni* Reinh.

psanitus Bgt.

H. desertella Jick., iv, 127.

gemellarii Ben.

H. duroi Hid., iv, 128.

rhodia Chemn.

f. minor Kob., iv, 261.

depressa Mts.

haploa West.

pachytoichea West.

kobelti West.

dillwyniana Pfr.

Subgenus EUPARYPHA Hartmann, 1842.

Euparypha HARTM., Erd.- u. Süßwasser Gasterop. Schw., p. 204, for *H. rhodostoma* = *pisana*.—*Conf.* for anatomy, SCHMIDT, Sty-lommat., p. 22, pl. 5, f. 23; MOQ.-TAND., Moll. Fr., p. 259, pl. 19, f. 9-19, SCHUBERTH, Arch. f. Naturg., 1892, p. 55, pl. 6, f. 1-3.

Shell narrowly umbilicate or subimperforate, *compact, solid, cretaceous*, subglobose or depressed and keeled, white or light, usually decorated with *many dark irregularly placed bands and lines*. Surface striated, *the striæ decussated by spiral incised lines*, at least on the spire. Suture superficial; last whorl descending or straight; aperture little oblique, lunate, *the lip sharp, not expanded*, thickened by an internal callus rib, columellar end triangularly reflexed. Type *H. pisana*, pl. 43, figs. 37, 38.

Jaw well arched, with two or three strong ribs denticulating both margins. Radula as in *Pentatænia*, *Helicigona*, etc.; the middle cusp of middle tooth is longer than the short, square basal plate, side cusps small; laterals similar but without inner cusp, outer cusp larger; marginals with a long bifid inner cusp and smaller outer cusp, the latter split on the outer teeth.

Genital system (pl. 61, figs. 1, 2, 3, 4, 5, *H. pisana*) characterized by the *lack of flagellum* on penis, the retractor and vas deferens terminal; spermatheca duct long, without a diverticulum (or according to Schmidt with a short one); *mucus glands two, long, simple* and tubular. Dart sack small, containing a straight, *four-edged, coronated dart* (fig. 2, 4, 5) like that of *Tachea splendida*.

Distribution, Mediterranean region, Canary Is., Madeira, etc.; *H. pisana* extending to southern England and throughout the whole range of the genus. *H. macandrewiana* is confined to the tiny Atlantic Islands known as the Salvages; *H. impugnata* and the beautiful varieties *geminata*, *grasseti*, *hierophanta* of *H. pisana*, are Canarian.

The cretaceous, many-banded shell, with non-expanded, inwardly thickened lip, is more like that of *Helicella* than the Pentatæniates; and the lack of a flagellum is also a strong differential feature, allying *Euparypha* to *Eremina*.

The single dart sack with its four-sided dart is a structure characteristic of the five-banded group; and the right eye retractor passes between the branches of the genitalia, as in normal *Helices*; these features at once removing *Euparypha* from the Xerophiloid stock. The simplicity of the two mucus glands is a character in common with *Helicigona* and *Iberus*; and evidently represents an earlier stage of development than the digitate type, which has been retained in these groups. I suppose the lack of flagellum to be a degenerative change. *Euparypha* is, therefore, a curious mixture, the mucous glands being of antique character, the male organs degenerate, and the dart modernized. Teeth and jaw offer nothing characteristic.

H. pisana, the typical species, is an abundant snail from northern Africa to southern England and the Atlantic islands. It has been split by "new school" authors into a multitude of alleged species, some of which may prove worth retention as local varieties. The principal names are as follows: *thusuroi*, *subpisana* Bgt., *bryscæ*, *radesiana* (Marès) Bgt., *chambardi*, *salemensis*, *gergisensis*, *carpiensis*, *hamadanica*, *djerbanica*, *zitanensis* Let. & Bgt., *maculata* Mke., *anonyma* W., *donatii*, *levesquei* (Berth.) Bgt., *pisanelle*, *pisanoopsis*, *dermoi* Serv. Other synonyms are *zonaria* Penn., *petholata* Oliv. *rhodostoma* Dr., *cigenda* Mont., *strigata* Dillw., *leucostoma* Risso, and doubtful varieties are *perruginea*, Mke., *punctella* M.-T., *subzonata* Bgt., *sigarellina* Charp., *alboranensis* (Webb. & Berth.) Mab. (not Pfr. et Auct.), *catocyphia* Bgt., iii, 256, *hyperplatæa* Serv., etc.; etc.

H. macandrewiana Pfr., iii, 224.

ustulata Lwe.

H. pisana Müll., iii, 224.

? *decorata* Pfr., iii, 225.

v. *pisanoopsis* Serv., iii, 225.

v. *aegusæ* Kob., iii, 225.

v. *sardoa* Ziegl., iii, 224.

v. *graphica* Morel.

- | | |
|---------------------------------------|--|
| <i>æstivalis</i> Bgt. | <i>calliostoma</i> A. & R. |
| v. <i>geminata</i> Mouss., iii, 224. | H. <i>dehnei</i> Rm., iii, 225. |
| <i>alboranensis</i> Pfr., iii, 224. | <i>epiglottidea</i> Bk. |
| v. <i>hierophanta</i> Mab., iii, 225. | f. <i>erythronixia</i> Bgt. |
| v. <i>grasseti</i> Tarn., iii, 225. | f. <i>thlipsa</i> West. |
| <i>pisanoides</i> Orb. | H. <i>subdentata</i> Fér. iii, 226. |
| H. <i>impugnata</i> Mouss., iii, 226. | <i>subcarinata</i> Mke. |
| <i>festiva</i> Lwe., Mss. | <i>cinea</i> Kl. |
| v. <i>subgeminata</i> Mouss. | H. <i>pisaniformis</i> Bgt., iii, 227. |
| H. <i>planata</i> Chemn., iii, 226. | H. <i>comaliana</i> Bgt., iii, 227. |
| <i>helicella</i> Wood. | v. <i>tiani</i> Bgt., iii, 227. |
| v. <i>arietina</i> Rossm. | v. <i>tohenica</i> Bgt., iii, 227. |
| v. <i>erythrostroma</i> Ph. | |

ADDITIONS AND CORRECTIONS.

Genus TROCHOMORPHA (p. 1).

To species of first group on page 4, add :

- T. *horiomphala* Pfr., iv, 51. T. *cathcartæ* Reeve, iv, 51.

From list of Philippine I. species omit *T. conomphala* Pfr., which is a young *Obba parmula*, teste Ponsonby in litt., and *T. radula* Pfr. a species of *Bensonia*; and add :

- | | |
|----------------------------------|---|
| T. <i>crassula</i> Mlldff. | T. <i>gracilis</i> Mlldff. |
| T. <i>pseudosericina</i> Mlldff. | T. <i>suturalis</i> Mlldff. |
| T. <i>morongensis</i> Mlldff. | T. <i>heptagyra</i> Mlldff. |
| T. <i>alticola</i> Mlldff. | T. <i>sericina</i> Mlldff. |
| T. <i>schmackeri</i> Mlldff. | T. <i>splendidula</i> v. <i>carinaria</i> Mlldff. |
| T. <i>intermedia</i> Mlldff. | T. <i>boholensis</i> Semper. |

Möllendorff (Ber. Senck. Nat. Ges. 1893, p. 74) considers the well-distinguished local races *sibuyanica* Hid., *boettgeri* Mlldff., with *quadrasi* Hid. as referable to *metcalfei* Pfr. if it be advisable to understand the species in such wide limits. Is *Tr. stenoazona* Mlldff., mentioned as a new species from Luzon, but still undescribed, in Ber. Senck. Ges. 1890, p. 213, another form of this species?

- T. *natunensis* Smith, Ann. Mag. N. H. '94, 455. Natuna Is.
 T. *partunda* (not "partunga," p. 5) Angas.
 T. *hidalgoana* Crosse (p. 6) is reported by Brazier from N. Georgia, Solomon Is.

Genus PUNCTUM Morse (p. 6).

Add: *P. massoti* Bgt., iii, 29, shown by Pollonera to belong here.

Genus LAOMA Gray (p. 8).

Add the following species described in Trans. N. Z. Inst. xxvi.

L. ciliata Suter.

And to section *Phriegnathus*, these from New Zealand:

L. murdochi Suter.

L. cheesemani Suter.

And the following from Tasmania: (see Ann. Mag. N. H., Jan., 1894, p. 64).

L. weldii Tenison-Woods.

L. pipaensis Petterd.

L. furneauxensis Petterd.

L. halli Cox.

L. hobarti Cox.

Genus FLAMMULINA Mart. (p. 10).

Suter in Ann. Mag. Nat. Hist. Jan., 1894, p. 64, gives a classification of Tasmanian Flammulinas from the examination of the dentition, as follows:

Sect.: *Flammulina*: *F. jungermanniæ* Pett., *sitiens* Cox, *luckmanni* Braz.

Sect.: *Gerontia*: *F. albanensis* Cox, *stanleyensis* Pett., *legrandi* Cox, *marchiannæ* Cox, *diemenensis* Cox, *gadensis* Cox, *tasmaniæ* Cox, *subrugosa* Braz., *mathinnæ* Pett., *macdonaldi* Cox, *bassi* Braz., *tamarensis* Pett.

Sect.: *Phacussa*: *F. savei* Pett., *stephensi* Cox, *hamiltoni* Cox.

Sect.: *Allodiscus*: *F. limula* Cox.

Sect.: *Thalassohelix*: *F. fordei* Braz.

Some of these may prove to be Charopas, however.

P. 13, add after *tranquilla* Cox, iii, 26. After *hamiltoni* Cox, iii, 87. *capta* Cox should stand *cæpta*.

Section *Allodiscus* Pils. (p. 14).

F. smithi Suter, Tr. N. Z. Inst. xxvi. *F. rustica* Suter, *t. c.* p. 135.

Section *Pyrrha* Hutt. (p. 15).

F. subincarnata Suter, Tr. N. Z. Inst., xxvi, p. 133.

Section *Phenacohelix* Sut. (p. 16).

F. pilula v. *unicolor* Suter, Tr. N. Z. Inst. xxvi, p. 134.

Section *Flammulina* Mart. (p. 18).

The species *novare* proves to belong to *Zonitidae*, and should be removed from list on p. 18.

F. pilsbryi Suter, Tr. N. Z. Inst., xxvi, p. 133.

Section *Carthæa* Hutton, 1884.

Carthæa HUTTON, Trans. N. Z. Inst., xvi, p. 189, type *H. kivi*.

These smooth, subtrochiform shells, with conspicuously streaked color-pattern, prove to belong to *Flammulina*, the typical species having been investigated by Mr. Suter. *F. kivi* is from New Zealand, *flosculus* from Norfolk Island.

F. kivi Gray, iii, 37.

F. flosculus Cox, viii, 77.

irradiata Gld.

radiaria Pfr.

Genus ENDODONTA Alb. (p. 20).

P. 24. *E. sculptilis* Pease should be a synonym under *E. fratercula* Pse. the former name being preoccupied in *Helix*. On p. 27 add iii, 39, after *E. lamellicosta* Garrett. Add to list:

E. mariannarum Quadr. & Mildff., Nachr. D. M. Ges. 1894, p. 14.

E. heptaptycha Quadr. & Mildff., Nachr. D. M. Ges. 1894, p. 15.

Mr. Suter in Proc. Linn. Soc. N. S. Wales, viii, p. 494, adopts the etymology "hunnaensis" for *E. (Ptychodon) hunuaensis* of his several previous publications. As I do not find the Hunua or Hunna Range on the maps accessible to me, I do not know which spelling is correct.

Add on p. 28 these from St. Helena (Conchologist ii, pp. 164, 165):

E. sexdentata Smith.

E. perarmata Smith.

Section *Charopa* Alb.

On p. 31, "Pterotropis" was a pen-error for *Pterodiscus*.

Omit "*E. raricostata*" from list on p. 33; place *E. coma* var. *beta* as a synonym under *v. globosa* Suter; add after *E. ostiolum* Cr., ii, 180. *E. serpentinula* Suter is a variety of *buccinella* Rve. *E. mutabilis* Suter is a synonym of *tau* Pfr.

E. anguiculus Reeve (p. 32). *E. pseudocoma* Suter.

v. montivaga and *v. fuscata* Sut.

Add the following Marianne and Natuna Island species of *Charopa*, Nachr. D. M. Ges. 1894, p. 13, 14:

E. fusca Quadr. & Mlldff.

E. quadrasi Mlldff.

E. rotula Quadr. & Mlldff.

E. persculpta Sm., Ann. Mag. '94.

The *Helix* (*Helicella*) *australis* of Menke, from Mt. Eliza, Swan River, may possibly belong to *Charopa* if it is really Australian; but it certainly does not look like one. See vol. iii, p. 103.

On p. 33, *E. microscopica* Cox (not Krauss) must be dropped in favor of *E. microcosmos* Cox.

On p. 34, *E. "cupera"* Cox=*cuprea*. For "retepora" and "reteporoides," read *retipora* and *retiporoides*.

Genus PHASIS Alb., and *Trachycystis* Pils. (p. 37).

Suter (Ann. Mag. N. H. 1894, p. 60) believes a caudal pore to be present in *Pella burnupi*, the dentition of which he figures. None was visible in the badly preserved specimens of *P. rariplcata* examined by me. On p. 39 the following corrections should be made:

P. inclara Morel.

P. zanguebarica Crav., iii, 105.

H. inops Morel. not Mouss.

Genus SCULPTARIA (p. 39).

Possibly this may prove to be a genus of *Protogona*. Ponsonby writes that Ancey's *S. chapmanni* (subsequently changed to *S. melvilliana*, Brit. Nat. 1892, p. 126) has been compared with the type of *damarensis* H. Ad., and found to be absolutely the same.

Genus AMPHIDOXIA (p. 41).

A. chiliensis Muhl. (not *chilensis*).

A. tenuistria Phil. (not *tenuistriata*).

Genus PYRAMIDULA (p. 42).

Section *Microconus* Strebel & Pfeffer, 1880.

Microconus STREBEL & PFEFFER, Beitr. Mex. Land- und Süswasser-Conchyl. iv, p. 29, type *M. wilhelmi* Pfr.

This name is proposed for a small species of eastern Mexico resembling *Pyramidula rupestris* in contour, but ribbed as in *P. rotundata* or *perspectiva*. It can hardly be regarded as more than a "section" of *Pyramidula*. The position of *hermanni* and *mazatlanica* is doubtful.

P. wilhelmi Pfr., iii, 53.

P. hermanni Pfr., iii, 22.

P. mazatlanica Pfr., ii, 204.

Section *Patulastra* Pfr. (44).

P. massoti Bgt. has been shown to be a *Punctum*. *P. luseana* Paiva becomes a synonym of *P. placida* Shuttl., an earlier name. The name *luseana* is repeated by error at foot of p. 47. *P. tenuicostata* Shuttl. being preoccupied in Helix, Servain calls the species *shuttleworthi*.

Section *Gonyodiscus* (p. 45).

Add to list of species, p. 47, the following Palæarctic forms:

P. machadoi Milne-Edw.

P. kompsa Mabilie.

rotundata Morel.

conciuna Lwe. not Jeffer.

v. azorica Mouss.

P. rotundata Müll.

P. scutula Shuttlw.

v. infracostata Westerl.

P. omalisiana Bgt.

abietina Paul., non Bgt.

omalisma, err. typ., p. 47.

P. chaperi West. Verh. k.-k. zoöl.-bot. Gesell. Wien. 1892, p. 27.

P. putrescens Lowe.

P. ganoda Mabilie.

Section *Lyrodiscus* (p. 48).

The type of this group is believed by Wollaston to be a Zonitid. This is not unlikely, but the shells before me are dull, and the animal is unknown.

Section *Lyrula* Wollaston, 1878.

Lyrula WOLLASTON, Testacea Atlantica p. 382, type *H. loweana*. Wollaston is disposed to class this elegant, spirally laciniate Patuloid snail with the Madeiran *H. lentiginosa*. The single species is from Lanzerote, Canary Is.

P. loweana Wollaston: (Not *lowei* Fér.)

torrefacta Lowe not C. B. Ad.

usurpans Furtado, iv, 40.

Section *Iulus* Woll., 1878,

This (preoccupied) name is proposed by Wollaston (Test. Atlant. p. 326) for the *Patula garachicoensis* Woll. (*H. agrestis* Lwe. in litt.), a minute form found in Tenerife, Canary Is. It is said to have relations with *P. putrescens* Lwe. of Palma, and *P. bertholdiana* Pfr., of the Cape Verdes. *P. garachicoensis* has not been figured, and I have seen no specimens. A variety *submarmorata* is described by Wollaston.

Genus PARARHYTIDA Anc. (p. 52).

Mr. T. D. A. Cockerell has called my attention to the fact that the name *Saissetia* (p. 53) is preoccupied in entomology (*Coccidae*), see Zool. Rec. 1865, and Proc. Amer. Ent. Soc. 1893, p. 54. He proposes to call the molluscan group PLATYRHYTIDA, the species *saisseti* being its type.

Genus THYSANOPHORA.

P. 58, add to synonyms of *T. boothiana*, *H. mauriniana* Orb., ("lavalleana" on plate). The reference after *T. incrustata* should stand: ii, 204.

Genus POLYGYRA (p. 68).

Add to list on pp. 76, 77, *P. thyroides* v. *pulchella* Ckll., (Journ. of Conch. 1892, p. 39), and *P. sanburni* W. G. Binn., iii, 145. Kingston, Idaho.

Genus POLYGRATIA (p. 81).

Cancel the sectional name *Entodina*, (p. 83) and the species *reyrei* Souv., as a radula received from Prof. Gwatkin proves it to belong to *Streptaxide*. The other species are quite different, and may as well be placed in *Systrophia*, from which they differ only in the parietal lamina.

Genus PLEURODONTA, Section *Isomeria* (p. 93).

P. meyeri Strubell, Conchyl. Cab., p. 693.

Genus CAMLÆNA (p. 101).

C. stolidota Quadr. & Mlldff. Paragua, Philippines.

The radula of *C. cicatricosa* is figured on pl. 34, fig. 10, from a mount kindly lent me by Prof. Gwatkin.

Section *Pseudobba* Mlldff. (p. 105).

C. brunonis Kobelt, Conch. Cab., p. 681. Halmaheira,

Genus OBBA (p. 107).

Add *H. conomphala* Pfr. to synonymy of *O. parmula* (p. 109).

<i>O. viridiflava</i> Mlldff.	<i>O. marginata</i> v. <i>nana</i> Mlldff.
<i>G. subhorizontalis</i> Mlldff.	v. <i>pallescens</i> Mlldff.
<i>O. flavopicta</i> Mlldff.	<i>O. moricandi</i> v. <i>radiata</i> Mlldff.
<i>O. basidentata</i> v. <i>grandis</i> Mlldff.	<i>O. scrobiculata</i> v. <i>conoidalis</i> Mlldff.

Genus PLANISPIRA Beck (p. 110).

Add to species of *Cristigibba*, (p. 113).

P. parthenia Kobelt, Conch. Cab., pl. 200, f. 9, 10.

And to list on p. 114, the following from W. Australia, Proc. Mal. Soc. i, p. 93.

P. bathurstensis Smith.

P. gascoyniensis Smith.

Genus CHLORITIS (p. 117).

Add these Australian species, which may belong in the preceding group :

C. millepunctata Smith.

C. rectilabrum Smith.

v. *cassiniensis* Smith.

C. subsulcata Mlldff. Cuban, Calamianes Is.

C. latecostata Kobelt.

C. (Sulcobasis?) djamuensis Kob.

C. buxina Heude. China.

Genus THERSITES (p. 125).

Section *Badistes* Gld. (p. 129).

Add below *T. OSCARENSIS* Cox (p. 131) the synonym *H. (Rhagada) inconvieta* Smith, Proc. Mal. Soc. i, p. 90. Add to *T. DERBYI* Cox (p. 131) the synonym *H. (Trachia) derbyana* Smith, t. c., p. 92. And the following species, described in the same place, all from N. W. Australia :

T. obliquerugosa Smith.

T. sykesi Smith.

T. prudhoensis Smith.

T. imitata Smith.

T. burneriensis Smith.

v. *cassiniensis* Smith.

T. montalivetensis Smith.

Subgenus RHAGADA (p. 135).

Smith in Proc. Malac. Soc. i, p. 89, suggests that *H. torulus* Fér. is the same as *reinga* Gray, and places *H. elachystoma* Mart. as a synonym under *richardsoni* Sm. He queries the subgeneric reference of *plectilis* and *carcharias*, but it seems to me unnecessarily, for the specimens of both examined by me are very close to typical *Rhagada*.

Genus PAPUINA (p. 136).

Col. Beddome writes me that *Helix plurizonata* Adams & Reeve, described evidently in error from Borneo, is really the same as *tomasinelliana* Tap.-Can. (p. 142) and *agnocheilus* Smith, which, therefore, become synonyms. Also that the "Group of *P. antiqua*" (p. 141) consists of one species, *antiqua*, of which the other names are synonyms. Add the following:

P. divaricata Kobelt.

P. lintschuana Kobelt.

The latter much like *P. goldiei* Braz. (p. 141), and like that, of doubtful generic position.

Genus PLECTOPYLIS (p. 143).

P. quadrasi Mlldff. Nachr. 1893, p. 172.

P. azona Gredl., viii, 158.

P. vallata Hde., viii, 158.

Genus PYROCHILUS (p. 154).

P. pyrostoma vars. *lucernalis* and *nigrescens* Kobelt.

Genus EPIPHRAGMOPHORA.

P. 197, for *petasensis* read *patasensis*.

Genus EULOTA (p. 200).

Add to *Plectotropis*, p. 209: *E. luzonica* Mlldff., Nachr. '94, p. 105.

Genus HELICOSTYLA (p. 216).

Col. Beddome (*in litt.*) informs me that *Cochlostyla belcheri* is a bleached *velata*; *C. andromache* is a color-variety of *polillensis*.

Another name for *Orthostylus* is *BULINA* Lesson, Illustr. de Zool. 1831, pl. 22, for *Helix (Bulina) rufogaster*. Perhaps it is meant for a spelling of *Bulinus*.

Genus LEUCOCHROA (p. 234).

Add: *L. debeauxi* v. *hypophysa* West., Verh. k.-k. zool.-bot. Ges. Wien, '92, p. 26.

The list on pp. 249, 250, was intended to be alphabetical, but through wrong paging of the *mss.* this end was defeated.

REFERENCE TO PLATES

FRONTISPIECE.

FIGURE.	PAGE.
1. <i>Ganesella japonica</i> Pfr. Genitalia. Pilsbry, del.	168
2. <i>Ganesella japonica</i> , end of penis laid open. Pilsbry, del. .	168
3. <i>Dorcasia alexandri</i> Gray. Genitalia. Pilsbry, del.	172
4. <i>Helicostyla</i> (<i>Crystallopsis</i>) <i>conformis</i> Fér After Tap.-Can.	220
5. <i>Helix pomatia</i> , penis, dart sack and vagina opened. Pilsbry, del.	
6. <i>Helix pomatia</i> L. Pilsbry, del.	317
<i>a.gl.</i> albumen gland; <i>atr.</i> atrium; <i>d.s.</i> dart sack; <i>epi.</i> epiphallus; <i>fl.</i> flagellum; <i>h.gl.</i> hermaphrodite gland; <i>m.gl.</i> mucus gland; <i>p.</i> penis; <i>r.</i> penis retractor; <i>sp.</i> spermatheca; <i>sp.d.</i> spermatheca duct; <i>ut.</i> uterus; <i>vag.</i> vagina; <i>v.d.</i> vas deferens.	
7. <i>Helix pomatia</i> , showing mantle lobes, etc. Pilsbry, del.	317
8. <i>Leptaxis undata</i> Lowe, dart sack and mucus glands. Pilsbry, del.	292
9. <i>Leptaxis undata</i> Lowe. Pilsbry, del.	292

PLATE 1.

1. <i>Laoma leimonias</i> Gray. Pilsbry, delin.	8
2. <i>Laoma acanthinulopsis</i> Sut., teeth. After Suter,	8
3, 4. <i>Laoma glabriuscula</i> Pfr., teeth and jaw. After Suter, .	8
5. <i>Punctum cryophilum</i> Mart., jaw. After Jickeli,	7
6. <i>Punctum pygmæum</i> Dr. After Schako, Mal. Bl., xx,	7
7. <i>Punctum pygmæum</i> , one plate of jaw x 1000. Ibid.	7
8. <i>Punctum conspectum</i> Bld. Teeth. Pilsbry, del.	7
9. <i>Punctum conspectum</i> Bld., jaw. After Binney,	7
10. <i>Laoma</i> (<i>Phryxgnathus</i>) <i>celia</i> Hutt. Pilsbry, del.	8
11-13. <i>Punctum pygmæum</i> Drap. Pilsbry, del.	7
14, 15, 16. <i>Amphidoxa</i> (?) <i>hookeri</i> Rve. Anat. Monatsber. Berl. Akad., 1877,	40

PLATE 2.

1, 2, 3. <i>Flammulina</i> (<i>Phacussa</i>) <i>hypopolia</i> Pfr. Suter, Tr. N. Z. Inst. xxiv,	12
4, 5. <i>Flammulina</i> (<i>Gerontia</i>) <i>pantherina</i> Hutt. Suter, Tr. N. Z. Inst. xvi,	14

FIGURE.

PAGE.

6, 7. Flammulina (Phenacohelix) pilula Reeve. Suter, Tr. N. Z. Inst. xvi,	16
8. Flammulina (Suteria) ide Gray. Suter, Tr. N. Z. Inst. xvi,	17
9, 10. Flammulina (Pyrrha) cressida Hutt. Suter, Tr. N. Z. Inst. xiv,	15
11, 12. Flammulina (Allodiscus) tullia Hutt. Suter, Tr. N. Z. Inst. xxiv,	14
13, 14. Flammulina (Allodiscus) godeti Sot. Suter, Tr. N. Z. Inst. xxiv,	14
15, 16. Flammulina corneofulva Pfr. Suter, Trans. N. Z. Inst., xxiv,	18
17, 18. Flammulina chiron Gray. Suter, Trans. N. Z. Inst. xxiv,	18
19, 20. Flammulina (Therasia) decidua Gray. Suter, Trans. N. Z. Inst., xxiv,	16
21. Flammulina (Therasia) thaisa Hutt. Hutton, Trans. N. Z. Inst, xvi,	16

PLATE 3.

1-3. Flammulina (Gerontia) pantherina Hutt. Shepperd, del.	14
4-6. Flammulina (Allodiscus) planulata. Hutt. Pilsbry, del.	14
7-9. Flammulina (Monomphalus) rossiteriana Cr. J. de Conch., 1873,	19
10, 11. Flammulina (Phacussa) hypopolia Pfr. Shepperd, del.	12
12. Flammulina (Allodiscus) tullia Gray, apex x 24. Pilsbry, del.	14
13. Flammulina (Phenacohelix) pilula Reeve. Pilsbry, del.	16
14-16. Flammulina (Therasia) thaisa Hutt. Type. Suter, del.	15
17-19. Flammulina (Pyrrha) cressida Hutt. Type. Suter, del.	15
20-22. Flammulina (Calymna) costulata Hutt. Type. Suter, del.	18
23. Flammulina zebra Le Guill. Conch. Icon.	17
24-26. Flammulina (Suteria) ide Gray. Shepperd, del.	17
27. Flammulina (Thalassohelix) zelandiæ Gray. Hutton, Tr. N. Z. Inst.	13
28. Flammulina (Thalassohelix) ziczac Gld. Pilsbry, del.	13
29. Flammulina (Thalassohelix) zelandiæ Gray. Shepperd, del.	13

PLATE 4.

30-32. Endodonta (Ptychodon) aorangi Suter. Pilsbry, del.	28
33, 34. Endodonta (Thaumatodon) derbesiana Cr. Pilsbry, del.	26

FIGURE.

PAGE.

35-37. Endodonta (Thaumatodon) multilamellata Grt. Pilsbry, del.	26
38. Internal palatal lamellæ of same, x 100. Pilsbry, del.	26
39. Endodonta obolus Gld. Pilsbry, del.	25
40, 41. Endodonta lamellosa Fér. Pilsbry, del.	25
42, 43. Endodonta (Helenoconcha) polyodon Sowb. P. Z. S., 1892,	28
44. Endodonta (Pterodiscus) alata Pfr. Pilsbry, del.	36

PLATE 5.

45-48. Endodonta (Libera) subcavernula Tryon. Pilsbry, del.	23
49, 50, 51. Endodonta ? (Brazieria) velata H. & J. Pilsbry, del.	29
52, 53. Endodonta fabrefacta Pse. Pilsbry, del.	25
54. Endodonta (Diglyptus) pagodiformis Sm. Pilsbry, del.	22

PLATE 6.

55, 56. Endodonta (Paratrochus) dalbertisi Braz. Hedley, P. L. S. N. S. W.	31
57-59. Endodonta (Charopa) coma Gray. Pilsbry, del.	31
60. Endodonta (Phenacharopa) novoseelandica Pfr. Pilsbry, del.	29
61, 62. Endodonta (Tropidotropis) trichocoma Cr. J. de Conch., 1868,	36
63-65. Endodonta (Charopa) tapirina Hutt. Pilsbry, del.	31
66. Endodonta (Nesophila) tiara Migh. Aperture. Pilsbry, del.	27
67, 68. Endodonta (Aeschrodomus) stipulata Rve. Pilsbry, del.	30
69, 70. Flammulina (Rhytidopsis) chelonites Crosse. J. de Conch., 1868,	20
71-73. Endodonta (Acanthoptyx) acanthinula Cr. Pilsbry, del.	36

PLATE 7.

1-3. Trochomorpha quadrasi Hid. Shepperd, del.	1
4-6. Trochomorpha merzianoides Grt. Shepperd, del.	1
7. Trochomorpha meleagris Pfr. Shepperd, del.	1
8, 9. Trochomorpha trochiformis Fér. Shepperd, del.	1
10-12. Amphidoxa marmorella Pfr. Conchyl. Cab.	40
13-15. Trochomorpha planorbis Less. Wieg., Webers' Zool. Erg.	1, 2
16-18. Amphidoxa (?) hookeri Rve. Monatsber Berl. Akad.,	40

FIGURE.

PAGE.

1877,	40
19-21. Amphidoxa (Stephanoda) dissimilis Orb. Voy. Am. Mérid.	40
22-24. Pararhytida (Platyrrhytida) saisseti Mont. Shepperd, del.	54
25-27. Pararhytida dictyodes Pfr. Shepperd, del.	53

PLATE 8.

1, 2. Endodonta (Phenacharopa) novoseelandica Pfr. Suter, Tr. N. Z. Inst., xxiv,	29
3, 4. Endodonta (Aeschrodomus) barbatula Rve. Suter, Tr. N. Z. Inst., xxiv,	30
5, 6. Endodonta (Ptychodon) microundulata Suter. Suter, Tr. N. Z. Inst., xxiv,	28
7, 8. Pararhytida (Platyrrhytida) astur Sow. W. G. Binn. Dent. Pulm. Moll.	54
9-12. Trochomorpha assimilis Grt. Pilsbry, del.	1
13, 14. Trochomorpha beckiana Pfr. After Semper,	1
15, 16. Trochomorpha metcalfi Pfr. After Semper,	1
16. Base of uterus of same, showing high insertion of v. d.	1
17. Trochomorpha troilus Gld. After Semper,	1
18, 19. Trochomorpha subtrochiformis. After Semper,	1

PLATE 9.

20, 21. Endodonta (Charopa) sylvia Hutt. After Suter,	32
22. Endodonta huaheimensis Grt. After Binney,	25
23, 24. Endodonta (Charopa) coma Gray. Pilsbry, del.	32
25. Endodonta (Acanthoptyx) acanthinula Cr. Pilsbry, del.	36
26. Endodonta (Libera) tumuloides Grt. After Binney,	23
27-29. Flammulina delta Pfr. After Hedley,	19
30-33. Trochomorpha timorensis Mart. After Stoliczka,	2
34. Endodonta recedens Grt. Pilsbry, del.	23
35-37. Pararhytida dictyodes Pfr. After Fischer,	53

PLATE 10.

1-3. Phasis menkeana Pfr. Shepperd, del.,	37
4. Sculptaria sculpturata Gray. Conch, Icon.,	39
5, 6. Phasis (Trachycystis) bisculpta Bens. Pilsbry, del.	37
7. Phasis (Trachycystis) bisculpta, apex. Pilsbry, del.	37
8, 9. Phasis (Trachycystis) browningii Bens. Pilsbry, del.	37
10, 11. Pyramidula (Planogyra) asteriscus Morse. After Morse,	45
12, 13. Pyramidula (Gonyodiscus) rotundata Müll. Pilsbry, del.	46

FIGURE.

PAGE.

14. *Pyramidula (Gonyodiscus) solaria* Mke. Pilsbry, del. . . 46
 15, 16. *Pyramidula rupestris* Drap. Pilsbry, del. . . 44

PLATE 11.

17. *Pyramidula strigosa* Gld. Pilsbry, del. . . 49
 18, 20, 23. *Pyramidula alternata* Say. Pilsbry, del. . . 49
 19, 22, 26. *Pyramidula perspectiva* Say. Pilsbry, del. . . 46
 21. *Pyramidula asteriscus* Morse. After Binney, . . . 45
 24. *Pyramidula (Helicodiscus) lineata* Say. After Binney, . . 51
 25. *Pyramidula rupestris* Drap. Pilsbry, del. . . 44
 27. *Pyramidula strigosa* Gld. After Binney, . . . 49
 28. *Pyramidula strigosa* Gld. Pilsbry, del. . . 49

PLATE 12.

- 1, 3, 7. *Planispira zonaria* L. After Tapparone-Canefri, . . 110
 2. *Planispira zonaria* L. After v. Martens, . . . 110
 4-6. *Planispira zonaria* L. Shepperd, del. . . 110
 8. *Planispira (Cristigibba) plagiocheila* T.-C. After Tap.-Can. 113
 9, 10, 12. *Planispira (Cristigibba) dominula* T.-C. After
 Tapparone-Canefri, . . . 113
 11, 13, 15. *Planispira (Cristigibba) macgregori* Hedl. After
 Hedley, . . . 112

PLATE 13.

- 16, 17. *Papuina grata* Mich. Tapparone Canefri, Ann. Mus.
 Civ. Genov. xix, . . . 137
 18, 19, 22. *Papuina taumantias* T.-C. Tapparone-Canefri,
 Ann. Mus. Civ. Genov. xix, . . . 137
 20, 21. *Papuina yulensis* Braz. Tapparone-Canefri, Ann.
 Mus. Civ. Genov. xix, . . . 137
 23, 24. *Papuina boyeri* F. & B. Hedley, P. L. S. N. S. W. . 137
 25. *Papuina louisianensis* Forbes. Hedley, P. L. S. N. S. W. 137
 26, 27. *Papuina brumeriensis* Forbes. Hedley, P. L. S. N. S. W. 137
 28. *Papuina macgillivrayi* Forbes. From orig. sketch by
 Hedley, . . . 137
 29. *Papuina fringilla* Pfr. After W. G. Binney, . . . 138

PLATE 14.

- 29-31. *Pyramidula (Helicodiscus) lineata* Say. Pilsbry, del. 51
 32, 33. *Pyramidula (Atlantica) semiplicata* Pfr. Pilsbry, del. 51
 34-36. *Pyramidula alternata* Say. Terr. Moll. iii, . . . 48
 37-39. *Pyramidula strigosa* Gld. Terr. Moll. iii, . . . 48
 40, 46. *Pyramidula alternata* Say. Pilsbry, del. . . 48

FIGURE.

PAGE.

47, 48. <i>Pyramidula</i> (<i>Helicodiscus</i>) <i>lineata</i> Say. After Morse,	51
41, 42. <i>Pupisoma lignicola</i> Stol. Journ. As. Soc. Beng., 1870,	52
43, 44. <i>Pupisoma philippinica</i> Mlldff. Landsehn. Cebu,	52
45. <i>Pyramidula perspectiva</i> Say. Pilsbry, del.	46

PLATE 15.

1. <i>Pyramidula lineata</i> Say. Pilsbry, del.	51
2. <i>Pyramidula balmei</i> Pöt. & Mich. Pilsbry, del.	46
3, 4. <i>Trachycystis biscalpta</i> Bens. Pilsbry, del.	37
5, 6. <i>Thysanophora turbiniformis</i> Pfr. After Binney,	55
7-10. <i>Thysanophora peraffinis</i> Ad. Pilsbry, del.	55
11, 12. <i>Camæna</i> (<i>Pseudobba</i>) <i>quoyi</i> Pfr., jaw. Mal. Bl. xx,	105
13, 14. <i>Camæna</i> (<i>Pseudobba</i>) <i>quoyi</i> Pfr., teeth. Mal. Bl. xx,	105

PLATE 16.

1, 2. <i>Thysanophora turbiniformis</i> Pfr. Shepperd, del.	55
3. <i>Thysanophora conspurcatella</i> Morel. Pilsbry, del.	55
4. <i>Thysanophora caeca</i> Guppy. Pilsbry, del.	55
5-7. <i>Thysanophora hypolepta</i> Shuttlew. Pilsbry, del.	55
8-10. <i>Thysanophora stigmatica</i> Pfr. Shepperd, del.	55
11-13. <i>Sagda cookiana</i> Gmel. Shepperd, del.	59
14, 15. <i>Sagda alligans</i> C. B. Ad. Shepperd, del.	60
16, 17. <i>Sagda connectens</i> C. B. Ad. Shepperd, del.	60
18-20. <i>Sagda</i> (<i>Hyalosagda</i>) <i>similis</i> C. B. Ad. Shepperd, del.	64
21. <i>Zaphysema tenerrima</i> C. B. Ad. Shepperd, del.	65

PLATE 17.

1-4. <i>Pedinogyra cunninghami</i> Gray. After Hedley,	158
5, 6. <i>Pedinogyra cunninghami</i> Gray. Shepperd, del.	158

PLATE 18.

1-7. <i>Camæna xanthoderma</i> (?) Mlldff. Pilsbry, del.	101
--	-----

PLATE 19.

8. <i>Camæna cicatricosa</i> Müll. After Heude.	101
9. <i>Camæna</i> (<i>Pseudobba</i>) <i>mamilla</i> Quoy. Shepperd, del.	105
10. <i>Camæna</i> (<i>Camænella</i>) <i>platydon</i> Pfr. Jahrb. D. M. Ges.	106
11. <i>Obba</i> (<i>Oreobba</i>) <i>codonodes</i> Pfr. Shepperd, del.	109
12. <i>Camæna monochroa</i> Sowb. After Hidalgo,	104
13. <i>Camæna</i> (<i>Phœnicobius</i>) <i>arata</i> Sowb. Shepperd, del.	104
14, 16. <i>Obba planulata</i> Lam. After Hidalgo,	107
15. <i>Obba planulata</i> Lam. Shepperd, del.	107

FIGURE.	PAGE.
17. <i>Obba basidentata</i> Pfr. After Hidalgo,	107
18, 19. <i>Planispira</i> (<i>Trachiella</i>) <i>tuckeri</i> Pfr. Pilsbry, del.	104
20-22. <i>Planispira</i> (<i>Angasella</i>) <i>cyrtopleura</i> Pfr. Shepperd, del.	114
23, 24. <i>Planispira</i> (<i>Trachia</i>) <i>vittata</i> Müll. Shepperd, del.	115
25. <i>Planispira</i> (<i>Trachia</i>) <i>asperella</i> Pfr. Conch. Icon.	115

PLATE 20.

26, 27. <i>Praticolella griseola</i> Pfr. Biol. Centr. Amer.	67
28. <i>Praticolella berlandieriana</i> Moric. Shepperd, del.	67
29-31. <i>Praticolella flavescens</i> Pfr. Biol. Cent. Amer.	67
32-34. <i>Polygyrella</i> (<i>Ammonitella</i>) <i>yatesi</i> Coop. Pilsbry, del.	81
35, 36. <i>Sagda</i> (<i>Odontosagda</i>) <i>hillei</i> Gundl. Pilsbry, del.	65
37, 38. <i>Polygyratia polygyrata</i> Born. Shepperd, del.	81
39, 40. <i>Entodina reyrei</i> Sow. Shepperd, del.	342
41, 43. <i>Polygyratia stenogyra</i> Pfr. Shepperd, del.	83
44-46. <i>Coxia macgregori</i> Cox. Conchyl. Cat.	83

PLATE 21.

1-5. <i>Praticolella ocampi</i> = <i>ampla</i> Pfr. After Strebel and Pfeffer,	67
(fig. 3, penis and appendix opened; fig. 4, talon).	
6. <i>Praticolella griseola</i> Pfr. After W. G. Binney,	67
7, 8. <i>Sagda cookiana</i> Gmel. Pilsbry, del.	59
9. <i>Sagda cookiana</i> , penis; flagellum above, appendix on left side, epiphallus branching to right, where retractor is inserted; vas deferens descending. Drawn by Pilsbry from specimen collected by J. B. Henderson	59
10. Appendix of same partly uncoiled,	59
11-14. <i>Polygyra albolabris</i> Say. Pilsbry, del.	70
15. Atrium and penis of same opened, showing pilaster,	70
16. Section of swollen base of spermatheca duct of same,	70

PLATE 22.

1. <i>Pleurodonte</i> (<i>Luquillia</i>) <i>gigantea</i> Scop. Shepperd, del.	100
2. <i>Pleurodonte</i> (<i>Parthena</i>) <i>angulata</i> Fér. Shepperd, del.	98
3. <i>Pleurodonte</i> (<i>Parthena</i>) <i>dominicensis</i> Pfr. Shepperd del.	98
4. <i>Pleurodonte</i> (<i>Zachrysia</i>) <i>trinitaria</i> Gundl. Shepperd, del.	96
5. <i>Pleurodonte</i> (<i>Thelidomus</i>) <i>lima</i> Fér. Shepperd, del.	96
6. <i>Pleurodonte</i> (<i>Eurycratera</i>) <i>jamaicensis</i> Chemn. Shepperd, del.	100
7, 8. <i>Pleurodonte</i> (<i>Labyrinthus</i>) <i>sieversi</i> Mart. Conch. Mittheil.	95
9, 10. <i>Pleurodonte</i> (<i>Polydonte</i>) <i>imperator</i> Montf. Shepperd, del.	98

FIGURE.

PAGE.

- 11, 12. *Macrocyclus laxata* Fér. Shepperd, del. . . . 165

PLATE 23.

- 13-17. *Pleurodonte* (*Parthena*) *dilatata* Pfr. Pilsbry, del. . 99
 18. *Pleurodonte* (*Parthena*) *angulata* Fér. After Binney, . 99
 19-23. *Pleurodonte* (*Zachrysia*) *auricoma havanensis*. Pilsbry, del. 96
 24. *Pleurodonte* (*Thelidomus*) *lima* Fér. After Semper, . 96
 25. *Pleurodonte* (*Thelidomus*) *aspera* Fér. After Binney, . 96

PLATE 24.

1. *Pleurodonte schroeteriana* Pfr. After Binney, . . . 88
 2. *Pleurodonte* (*Caprinus*) *josephinæ* Fér. After Binney, . 90
 3. *Pleurodonte* (*Caprinus*) *nuxdenticulata* Fér. After Binney, 90
 4. *Pleurodonte acuta* Lam. Pilsbry, del. 88
 5. *Pleurodonte invalida* C. B. Ad. After Semper, . . . 88
 6, 7. *Pleurodonte acuta* Lam. Pilsbry, del. 88
 8-10. *Pleurodonte* (*Caprinus*) *orbiculata* Fér. Pilsbry, del. 91
 11, 12. *Pleurodonte dentiens* Fér. After Binney, . . . 91

PLATE 25.

1. *Pleurodonte* (*Caracolus*) *caracolla*. W. Shepperd, del. . 92
 2, 3. *Pleurodonte* (*Isomeria*) *faunus* v. *ritchiana*. W. Shepperd, del. 93
 4, 5. *Pleurodonte* (*Labyrinthus*) *labyrinthus* Chem. W. Shepperd, del. 95
 6, 7. *Pleurodonte sloaneana* v. *vendryesi* Ckll. W. Shepperd, del. 88
 8. *Pleurodonte acuta* v. *nobilus* Ad. W. Shepperd, del. . 88
 9. *Cepolis cepa* Müll. W. Shepperd, del. 179
 10. *Pleurodonte* (*Caprinus*) *nuxdenticulata* Chem. W. Shepperd, del. 90
 11. *Pleurodonte* (*Caprinus*) *isabella* Fér. W. Shepperd, del. 90
 12, 13. *Pleurodonte* (*Gonostomopsis*) *auridens* Rang. W. Shepperd, del. 92

PLATE 26.

1. *Pleurodonte* (*Caracolus*) *marginella* Gmel. After Binney, 92
 2. *Pleurodonte* (*Caracolus*) *marginella* v. *semiaperta*. After Binney, 92
 3. *Pleurodonte* (*Caracolus*) *marginella* Gmel. After Binney, 92
 4, 5, 6. *Pleurodonte* (*Caracolus*) *rostrata* Pfr. Pilsbry, del. 92

FIGURE.	PAGE.
7, 8. <i>Pleurodonte</i> (<i>Caracollus</i>) <i>caracolla</i> Linn. After Semper,	92
9. <i>Pleurodonte</i> (<i>Labryinthus</i>) <i>labyrinthus</i> Chemn. After Semper,	95

PLATE 27.

1, 2. <i>Thersites</i> (<i>Sphærospira</i>) <i>rawnesleyi</i> Cox. W. Shepperd, del.	132
3. <i>Thersites</i> (<i>Badistes</i>) <i>bitæniata</i> Cox. W. Shepperd, del.	129
4. <i>Thersites</i> (<i>Sphærospira</i>) <i>blomfieldi</i> v. <i>warroensis</i> . After Tap.-Can.	132
5. <i>Thersites</i> (<i>Badistes</i>) <i>gulosa</i> Gld. W. Shepperd, del.	129
6. <i>Thersites</i> (<i>Sphærospira</i>) <i>pomum</i> Pfr. W. Shepperd, del.	134
7, 8. <i>Thersites</i> (<i>Glyptorhagada</i>) <i>kooringensis</i> Ang. W. Shepperd, del.	129
9, 10. <i>Thersites</i> (<i>Glyptorhagada</i>) <i>kooringensis</i> Ang. After Cox,	129
11-13. <i>Thersites</i> (<i>Rhagada</i>) <i>supracostulata</i> Schep. After Schepman.	135
14, 15. <i>Thersites</i> (<i>Rhagada</i>) <i>floresiana</i> Mart. Weber's Zool. Ergeb.	135
16-18. <i>Thersites</i> (<i>Rhagada</i>) <i>carcharias</i> Pfr. W. Shepperd, del.	135
19. <i>Thersites</i> (<i>Glyptorhagada</i>) <i>silveri</i> Ang. W. Shepperd, del.	129

PLATE 28.

1-4. <i>Chloritis</i> <i>porteri</i> Cox. Pilsbry, del.,	121
5-9. <i>Chloritis</i> <i>argillacea</i> Fér. After Wiegmann,	121
10. <i>Chloritis</i> <i>dinodeomorpha</i> Tap.-Can. After Tapp.-Can.	119

PLATE 29.

1-3. <i>Chloritis</i> <i>ungulina</i> L. E. Shepperd, del.	117
4, 5. <i>Chloritis</i> <i>porteri</i> Cox. E. Shepperd, del.	121
6, 7. <i>Plecteulota</i> <i>goniostoma</i> Mlldff. Nachr. 1892,	122
8. <i>Thersites</i> <i>richmondiana</i> Pfr. E. Shepperd, del.	125
9, 10. <i>Chloritis</i> (<i>Sulcobasis</i>) <i>sulcosa</i> Alb. Novit. Conch.	120
11. <i>Papuina</i> <i>splendescens</i> Cox. Shepperd, del.	137
12. <i>Papuina</i> <i>lituus</i> Less. Conchyl. Cab.	137
13. <i>Papuina</i> <i>nortoni</i> Braz. E. Shepperd, del.	137
14, 15. <i>Papuina</i> <i>trobriandensis</i> Hedl. E. Shepperd, del.	137
16. <i>Anoglypta</i> <i>launcestonensis</i> Reeve. E. Shepperd, del.	160

PLATE 30.

1-3. <i>Polygyra</i> <i>cereolus septemvolva</i> Say. Shepperd, del.	71
4. <i>Polygyra</i> <i>auriculata</i> Say. Shepperd, del.	71
5. <i>Polygyra</i> <i>septemvolva</i> Say. After Binney,	71

FIGURE.		PAGE.
6.	<i>Polygyra troostiana</i> Lea. After Binney, . . .	71
7.	<i>Polygyra postelliana</i> Lea. After Binney, . . .	71
8.	<i>Polygyra tridentata</i> Say. After Binney, . . .	74
9, 10.	<i>Polygyra appressa perigrapta</i> Pils. Shepperd, del. . .	74
11, 12.	<i>Polygyra tridentata</i> Say. After Binney, . . .	74
12.	<i>Polygyra inflecta</i> Say. After Binney, . . .	74
13, 14.	<i>Polygyra albolabris maritima</i> Pils. Shepperd, del. . .	74
15.	<i>Polygyra clausa</i> Say. After Binney, . . .	74
16.	<i>Polygyra albolabris</i> Say. After Binney, . . .	74
17, 18, 19.	<i>Polygyra sayi</i> Binney. After Binney, . . .	74
20.	<i>Polygyra clausa</i> Say. After Binney, . . .	74
21.	<i>Polygyra kiawaensis</i> Simpson. Pilsbry, del. . .	74

PLATE 31.

22-24.	<i>Polygyra (Stenotrema) monodon v. aliciae</i> . E. Shepperd, del.	77
25.	<i>Polygyra (Stenotrema) monodon</i> , jaw. After Binney, . . .	78
26.	<i>Polygyra (Stenotrema) hirsuta</i> Say. After Binney, . . .	78
27.	<i>Polygyra (Stenotrema) spinosa</i> Lea. After Binney, . . .	77
28-30.	<i>Polygyrella polygyrella</i> Bld. & Coop. Shepperd, del. . .	80
31, 32.	<i>Polygyrella polygyrella</i> Bld. & Coop. After Binney, . . .	79
33-35.	<i>Polygyrella harfordiana</i> Coop. Pilsbry, del.	80
36-40.	<i>Glyptostoma newberryanum</i> W. G. B. After Binney, . . .	193
41.	<i>Polygyrella polygyrella</i> Bld. & Coop. After Binney, . . .	80

PLATE 32.

42, 43.	<i>Chloritis leei</i> Cox. After Hedley,	119
44, 45.	<i>Planispira delibrata</i> Bens. After Stoliczka,	115
46, 47, 52.	<i>Thersites (Xanthomelon) pachystyla</i> Pfr. After Semper,	134
48.	<i>Thersites (Sphærospira) blomfieldi</i> Cox. After Hedley, . . .	132
49.	<i>Thersites (Hadra) bipartita</i> Fér. After Semper,	131
50, 51.	<i>Thersites (Sphærospira) rainbirdi</i> Cox. After Hedley, . . .	132

PLATE 33.

1.	<i>Thersites richmondiana</i> Pfr. Hedley, Proc. R. Soc. Q'ld.	128
2, 3.	<i>Thersites (Sphærospira) mitchellæ</i> Cox. Pilsbry, del.	133
4-7.	<i>Thersites (Badistes) gulosa</i> Gld. Hedley, Rec. Austr. Mus.	130

PLATE 34.

1, 2.	<i>Thersites (Sphærospira) mitchellæ</i> Cox. Pilsbry, del.	132
3.	<i>Planispira zonaria</i> L. Pilsbry, del.	110
4.	<i>Planispira (Trachia) asperella</i> Pfr. Pilsbry, del.	115

FIGURE.	PAGE.
5, 6. <i>Planispira</i> (<i>Trachia</i>) <i>trochalia</i> Bens. Pilsbry, del.	115
7. <i>Thersites richmondiana</i> Pfr. After Hedley, . . .	128
8, 9. <i>Albersia zonulata</i> Fér. Pilsbry, del.	125
10. <i>Camæna cicatricosa</i> Müll. Pilsbry, del.	342
11. <i>Papuina moseleyi</i> Smith. Pilsbry, del.	137
12. <i>Papuina vexillaris</i> Pfr. Pilsbry, del.	137

PLATE 35.

1. <i>Sagda</i> (<i>Hyalosagda</i>) <i>haldemaniana</i> Ad. After Binney, .	59
2-8. <i>Sagda</i> (<i>Hyalosagda</i>) <i>similis</i> Ad. Pilsbry, del. . . .	59
9, 10. <i>Zaphysema tunicata</i> Pfr. After Binney,	66
11, 12. <i>Zaphysema tenerrima</i> Ad. Pilsbry, del.	66

PLATE 36.

1-3. <i>Allognathus graellsiana</i> Pfr. After Schuberth. . . .	290
4. <i>Helicodonta obvoluta</i> Müll.	285
5, 6. <i>Helicodonta lenticula</i> Fér. Pilsbry, del.	285
7, 8. <i>Helicodonta maroccana</i> Mor. After Schuberth. . . .	285
9, 10. <i>Helicodonta lusitanica</i> Pfr. After Schuberth. . . .	285
11, 12. <i>Polygyrella</i> (<i>Ammonitella</i>) <i>yatesi</i> Coop. After Binney, .	81
13, 14. <i>Leucochroa candidissima</i> Drap. Pilsbry, del. . . .	232
15. <i>Leucochroa boetica</i> Rossm. After Schmidt.	232
16. <i>Leucochroa boissieri</i> Charp. After Binney,	232

PLATE 37.

1. <i>Papuina moseleyi</i> Smith. Pilsbry, del.	138
2. <i>Papuina conscendens</i> Cox. Pilsbry, del.	138
3, 4. <i>Papuina vexillaris</i> Pfr. Pilsbry, del.	138
5. <i>Papuina trobriandensis</i> Hedley. Hedley, Proc. Linn. Soc. N. S. W.	138
6. <i>Papuina brazieræ</i> Braz. Tapparone-Canefri, Ann. Mus. Civ. Genov.	138
7, 8. <i>Papuina fringilla</i> Pfr. Pilsbry, del.	138
9, 10. <i>Papuina vexillaris</i> Pfr. Pilsbry, del.	138
11. <i>Papuina conscendens</i> Cox. Pilsbry, del.	138

PLATE 38.

1. <i>Acavus hæmastomus</i> L. Pilsbry, del.	153
2, 3. <i>Pyrochilus lampas</i> Müll. Kobelt, Conch. Cab. . . .	154
4. <i>Helicophanta goudotiana</i> Fér. Shepperd, del.	151
5. <i>Helicophanta cornugiganteum</i> Chemn. Pilsbry, del. . . .	151
6, 7. <i>Dorcasia alexandri</i> var. <i>rotundata</i> . Journ. de Conch. 1887,	172

FIGURE.	PAGE.
8. <i>Dorcasia globulus</i> Müll. Shepperd, del.	172
9. <i>Stylodonta unidentata</i> Chemn. Shepperd, del.	149
10, 12. <i>Ampelita</i> (<i>Pœcilocystylus</i>) <i>viridis</i> Desh. Moll. Madag.	158

PLATE 39.

1-5. <i>Camænella platyodon</i> Pfr. Pilsbry, del.	106
6. <i>Obba basidentata</i> Pfr. After Semper,	107
7, 8, 11, 12, 13. <i>Obba planulata</i> Lam. After Semper,	108
9, 10. <i>Neocepholis merarcha</i> Mab. Shepperd, del.	107

PLATE 40.

1-4. <i>Plectopylis jovia</i> Mabilie. Pilsbry, del.	144
5, 6. <i>Plectopylis achatina</i> Gray. Conchyl. Cab., pl. 66,	144
7. <i>Plectopylis achatina</i> Gray. P. Z. S. 1874,	144
8. <i>Plectopylis achatina</i> Gray. Pilsbry, del.	144
9-11. <i>Plectopylis ponsonbyi</i> Godw.-Aust. Shepperd, del.	144
12. <i>Plectopylis ponsonbyi</i> Godw.-Aust. Pilsbry, del.	144
13-15. <i>Plectopylis fultoni</i> Godw.-Aust. Shepperd, del.	144
16-18. <i>Möllendorffia hensaniensis</i> Gredl. Ann. K. K. Mus.	
1887,	289

PLATE 41.

19-22. <i>Corilla rivolii</i> Desh. Shepperd, del.	147
23-25. <i>Corilla charpentieri</i> v. <i>hinidunensis</i> Nev. Shepperd,	
del.	147
26, 27. <i>Traumatophora triscapta</i> Mart. Novit. Conch.	146
28, 29. <i>Stegodera angusticollis</i> Mart. Novit. Conch.	147
30. <i>Albersia granulata</i> Quoy. Voy. Astrol.	124
31-33. <i>Ampelita hemioxia</i> Pils. Shepperd, del.	155

PLATE 42.

34-36. <i>Plectopylis cyclaspis</i> Bens. J. A. S. Beng. xl.	144
37, 38. <i>Corilla erronea</i> Alb. Reisen Phil.	147
39. <i>Trachia penangensis</i> Stol. J. A. S. Beng. xlii,	115
40. <i>Ampelita loucoubeënsis</i> Crse. After Brancsik.	156
41-46. <i>Caryodes dufrenoyi</i> Leach. After Semper, Hedley	
and Ten.-Woods,	162

PLATE 43.

19-21. <i>Helicigona</i> (<i>Elona</i>) <i>quiniperiana</i> Fér. After Hidalgo,	307
22, 23. <i>Helicigona lapicida</i> Linn. After Hidalgo,	298
24, 25. <i>Helicigona</i> (<i>Fruticocampylæa</i>) <i>narzanensis</i> Kryn.,	
after Kobelt,	304

FIGURE.	PAGE.
26. <i>Geomitra</i> (<i>Plebecula</i>) <i>punctulata</i> Sowb. Shepperd, del.	239
27, 28. <i>Helicigona</i> (<i>Chilostoma</i>) <i>planospira</i> Lam. After Kobelt	299
29, 30. <i>Helicella</i> (<i>Xerocampylæa</i>) <i>zelebori</i> Pfr. After Kobelt,	253
31. 32. <i>Helicigona</i> (<i>Isognomostoma</i>) <i>personata</i> Drap. Shepperd del.	308
33, 35. <i>Helicigona</i> (<i>Tacheocampylæa</i>) <i>raspailii</i> Payr. Moll. Nouv., Litig.	305
36. <i>Leptaxis</i> (<i>Pseudocampylæa</i>) <i>lowei</i> Fér. Shepperd, del.	292
37, 38. <i>Helix</i> (<i>Euparypha</i>) <i>pisana</i> Müll. After Hidalgo,	335
39, 40. <i>Allognathus</i> <i>grællsiana</i> Pfr. After Hidalgo,	290
41. <i>Leptaxis</i> <i>undata</i> Wood. Shepperd, del.	292
42. <i>Helicigona</i> (<i>Chilostoma</i>) <i>setosa</i> Ziegl. After Rossm.	299
43. <i>Helix</i> (<i>Hemicycla</i>) <i>plicaria</i> Lam. Shepperd, del.	326
44. <i>Helix</i> (<i>Hemicycla</i>) <i>sauleyi</i> Orb. Shepperd del.	326
45. <i>Leptaxis</i> <i>webbiana</i> Lowe. Shepperd del.	292
46. <i>Helicigona</i> (<i>Arianta</i>) <i>arbustorum</i> L. After Kobelt,	306

PLATE 44.

1-3. <i>Helix</i> (<i>Levantina</i>) <i>guttata</i> v. <i>sesteri</i> Gall. Bull. Soc. Mal. Fr.	332
4, 5. <i>Helix</i> (<i>Tachea</i>) <i>nemoralis</i> L. After Hidalgo,	321
6, 7. <i>Helix</i> (<i>Helicogena</i>) <i>asemnis</i> v. <i>vetusta</i> Mts. Archiv Naturg., 1889,	317
8. <i>Helix</i> (<i>Iberus</i>) <i>gualtierana</i> L. After Hidalgo,	328
9, 10. <i>Helix</i> (<i>Otala</i>) <i>vermiculata</i> Müll. After Hidalgo,	323
11. <i>Helix</i> (<i>Otala</i>) <i>lactea</i> Mull. After Hidalgo,	323
12, 13. <i>Helix</i> (<i>Eremina</i>) <i>desertorum</i> Forsk. After Rossm.	334
14. <i>Helix</i> (<i>Eremina</i>) <i>desertorum</i> v. <i>chilembia</i> . After Bgt.	334
15. <i>Helix</i> (<i>Iberus</i>) <i>scabriuscula</i> Desh. After Rossm.	328
16, 17. <i>Helix</i> (<i>Iberus</i>) <i>muralis</i> Müll. Shepperd, del.	328
18. <i>Helix</i> (<i>Iberus</i>) <i>sicana</i> Fér. After Rossm.	328

PLATE 45.

1, 2. <i>Oxychona</i> <i>costaricensis</i> Roth. Shepperd, del.	189
3-5. <i>Oxychona</i> <i>altispira</i> Mart. Biol. Centr. Amer.	189
6. <i>Epiphragmophora</i> <i>fidelis</i> Gray. Shepperd, del.	194
7. <i>Lysinoe</i> <i>ghiesbreghti</i> Nyst. Biol. Centr. Amer.	191
8. <i>Oxychona</i> <i>bifasciata</i> Burrow. Viag. al Pacif.	189
9, 10. <i>Oxychona</i> <i>trigonostoma</i> v. <i>stolliana</i> Mts. Biol. Centr. Amer.	189

PLATE 46.

11. <i>Panda</i> <i>falconeri</i> Reeve. Conch. Icon.	163
12. <i>Panda</i> <i>atomata</i> Gray, apex. After Hedley,	163
13, 14. <i>Panda</i> <i>larryi</i> Braz. After Cox,	163
15. <i>Caryodes</i> <i>dufresnii</i> Leach. After Hedley,	162

FIGURE.		PAGE.
16.	<i>Caryodes dufresnii</i> Leach. Shepperd, del.	162
17-19.	<i>Papuina ianthé</i> Smith. Shepperd, del.	137
20.	<i>Solaropsis serpens</i> Martyn. Shepperd, del.	166
21.	<i>Solaropsis braziliana</i> Fér. Ostas. Conch.	166

PLATE 47.

1.	<i>Panda falconeri</i> Reeve. After Semper,	163
2, 4.	<i>Panda atomata</i> Gray. After Hedley,	163
3.	<i>Panda atomata</i> Gray, opened penis. Pilsbry, del.,	163
5.	<i>Anoglypta launcestonensis</i> Rve., base of <i>sp. d.</i> Pilsbry, del.	160
6, 7.	<i>Anoglypta launcestonensis</i> Rve. Pilsbry, del.	160
8.	<i>Anoglypta launcestonensis</i> Rve., penis. Pilsbry, del.	160

PLATE 48.

9.	<i>Stylodonta studeriana</i> Fér. Pilsbry, del.	150
10, 11.	<i>Anoglypta launcestonensis</i> Rve. Pilsbry, del.	160
12, 13.	<i>Helicophanta magnifica</i> Fér. Pilsbry, del.	152
14.	<i>Acavus hæmastomus</i> L. Pilsbry, del.	153
15, 16.	<i>Panda atomata</i> Gray. Pilsbry, del.	163
17.	<i>Panda falconeri</i> Reeve. After Semper,	163

PLATE 49.

18.	<i>Helicophanta goudotiana</i> Fér. After Brancsik,	151
19-23.	<i>Helicophanta magnifica</i> Fér. Pilsbry, del.	151
24.	<i>Caryodes dufresnii</i> Leach. After Semper,	162
25.	<i>Ampelita sepulchralis</i> Fér. Pilsbry, del.	155

PLATE 50.

1, 8, 26.	<i>Acavus skinneri</i> Rve. After Semper,	153
3.	<i>Acavus hæmastomus</i> L. After Semper,	153
4.	<i>Acavus phoenix</i> Pfr., egg. Shepperd, del.	153
5.	<i>Acavus phoenix</i> Pfr., teeth. After Binney,	153
6, 7, 9.	<i>Stylodonta studeriana</i> Fér.. (penis below). Arch. Zool. Gén. et Expér.	150
1, 22, 57, 62, 69.	<i>Stylodonta studeriana</i> Fér. After Binney,	150

PLATE 51.

1, 2.	<i>Macrocyclus laxata</i> Fér. Pilsbry, del.	165
3.	<i>Dorcasia globulus</i> Müll. After Binney,	172
4-8.	<i>Polymita picta</i> Born. Pilsbry, del.	188
9-11.	<i>Oxychona bifasciata</i> Burrow. Pilsbry, del.	189

PLATE 51a.

FIGURE.

PAGE.

[By error this number was duplicating in preparing the plates. As the figures are entirely different, there need be no confusion in actual reference from the text].

- 1-6. *Ampelita xystrera* Val. (from no. 63,879 Acad. coll.
Pilsbry, del. 155
7-12. *Thersites* (*Rhagada*) *solorensis* Mart. After Wiegman. 135

PLATE 52.

12. *Cepolis* (*Coryda*) *alauda* Fér. Pilsbry, del. 182
13. *Cepolis alauda*, penis with flagellum. The thread-like
retractor should pass over *v.d.* and insert on penis, 182
14. *Cepolis* (*Hemitrochus*) *varians* Mke. Pilsbry, del., . 184
15. *Cepolis* (*Plagiptycha*) *salvatoris* Pfr. Pilsbry, del. . 185
16. *Cepolis* (*Cysticopsis*) *cubensis* Pfr. Pilsbry, del. . 187
17. *Epiphragmophora cordovana* Pfr. After Strebel, . 197
18, 19, 20, 22. *Cepolis* (*Eurycampta*) *bonplandi* Lam. Pils-
bry, del. 181
21. *Cepolis* (*Jeanneretia*) *parraiana* Orb. After Poey, . 180

PLATE 53.

1. *Helicostyla* (*Orustia*) *versicolor* Mlldff. Shepperd, del. . 225
2. *Helicostyla* (*Helicobulinus*) *turbinoides* Brod. Shepperd,
del. 227
3. *Helicostyla* (*Orthostylus*) *pithogaster* Fér. After Hidalgo, 227
4. *Helicostyla* (*Canistrum*) *ovoidea* Brug. Shepperd, del. . 230
5. *Helicostyla* (*Phengus*) *opalina* Sowb. After Pfeiffer, . 230
6. *Helicostyla* (*Hypselostyla*) *connectens* Mlldff. After Mlldff. 228
7. *Helicostyla mirabilis* Fér. After Hidalgo, 224
8. *Helicostyla* (*Chrysallis*) *chrysalidiformis* Sowb. After Rve. 231
9. *Helicostyla* (*Prochilus*) *virgata* Jay. Shepperd, del. . 231
10. *Helicostyla* (*Cochlodoyas*) *viridostriata* Lea. Shepperd,
del. 225
11. *Helicostyla* (*Eudoxus*) *effusa* Pfr. After Reeve, . . 229

PLATE 54.

1. *Helicostyla* (*Canistrum*) *stabilis* Jonas. After Semper, . 230
2-4. *Chloræa benguetensis* Semp. After Semper, . . . 215
5. *Helicostyla* (*Orustia*) *monticula* Sby. After Semper, . 216
6-8. *Helicostyla butleri* Pfr. After Semper, 216
9. *Helicostyla* (*Orthostylus*) *pithogaster* Fér. After Semper, 217
10. *Helicostyla* (*Calocochlea*) *festiva* Don. After Semper, 216
11. *Helicostyla* (*Eudoxus*) *ægle* Brod. After Semper, . 216
12. *Helicostyla* (*Calocochlea*) *puleherrima* Sowb. After Semper, 216

PLATE 55.

FIGURE.	PAGE.
1, 2. <i>Eulota fruticum</i> Müll. After Hartmann, . . .	202
3, 4. <i>Eulota fruticum</i> Müll. After Dupuy, . . .	202
5. <i>Eulota duplocincta</i> Martens. After Martens, . . .	202
6, 7. <i>Eulota</i> (<i>Cathaica</i>) <i>fasciola</i> Drap. After Philippi, . . .	206
8, 9. <i>Eulota</i> (<i>Pseudiberus</i>) <i>tectumsinense</i> Mts. Shepperd, del.	207
10, 11. <i>Helicostyla</i> (<i>Crystallopsis</i>) <i>tenimberica</i> Mlldff. Nach. 1892, . . .	220
12. <i>Helicostyla</i> (<i>Corasia</i>) <i>virgo</i> Brod. After Hidalgo, . . .	219
13. <i>Helicostyla</i> (<i>Calocochlea</i>) <i>pulcherrima</i> Sowb. Shepperd, del. . .	222
14. <i>Helicostyla</i> (<i>Anixa</i>) <i>moreletiana</i> Pfr. Shepperd, del. . .	223
15-17. <i>Chloræa sirena</i> Beck. Shepperd, del. . .	215
18. <i>Ganesella capitium</i> Bens. Shepperd, del. . .	168
19. <i>Eulota similis</i> Fér. Shepperd, del. . .	203
20, 21. <i>Hygromia cinctella</i> Drap. After Dupuy, . . .	271
22-24. <i>Hygromia</i> (<i>Ciliella</i>) <i>ciliata</i> Ven. After Dupuy, . . .	276
25, 26. <i>Hygromia</i> (<i>Dibothrion</i>) <i>bidens</i> Chem. Shepperd, del.	278
27, 28. <i>Hygromia</i> (<i>Fruticicola</i>) <i>hispida</i> L. After Dupuy, . . .	273
29, 30. <i>Hygromia</i> (<i>Monacha</i>) <i>incarnata</i> Müll. Shepperd, del.	271
31, 32. <i>Vallonia pulchella</i> Müll. Pilsbry, del. . .	282

PLATE 56.

1, 2. <i>Cepolis</i> (<i>Hemitrochus</i>) <i>varians</i> Mke. After Binney . . .	183
3, 4. <i>Cepolis</i> (<i>Coryda</i>) <i>alauda</i> Fér. Shepperd, del. . .	181
5. <i>Cepolis</i> (<i>Dialeuca</i>) <i>nemoroides</i> Ad. Shepperd, del. . .	183
6. <i>Cepolis</i> (<i>Dialeuca</i>) <i>fuscocincta</i> Ad. Shepperd, del. . .	183
7. <i>Cepolis</i> (<i>Cysticopsis</i>) <i>cubensis</i> Pfr. Shepperd, del. . .	186
8, 9. <i>Cepolis</i> (<i>Plagioptycha</i>) <i>duelosiana</i> Fér. Shepperd, del.	185
10. <i>Polymita picta</i> Born. Shepperd, del. . .	188
11, 12. <i>Leucochroa</i> (<i>Sphincterorchila</i>) <i>boissieri</i> Charp. After Kobelt, . . .	234
13. <i>Leucochroa candidissima</i> Drap., large var. After Kobelt, . . .	232
14, 15. <i>Leucochroa cariosa</i> Oliv. After Bgt. . .	232
16, 17. <i>Helicodonta</i> (<i>Trissexodon</i>) <i>constricta</i> Boub. After Kobelt, . . .	285
18, 19. <i>Helicodonta</i> (<i>Caracolina</i>) <i>lens</i> Fér. After Kobelt, . . .	285
20-22. <i>Moellendorffia erdmanni</i> S. & B. After Boettger, . . .	289
23, 24. <i>Helicodonta</i> (<i>Aspasita</i>) <i>triaria</i> Friv. After Kobelt, . . .	285
25-27. <i>Helicodonta obvoluta</i> Drap. After Dupuy, . . .	285
28-30. <i>Helicodonta biconcava</i> Hde. After Heude, . . .	285
31-33. <i>Helicodonta</i> (<i>Drepanostoma</i>) <i>nautiliformis</i> Porro. After Rossm.	285

PLATE 57.

34-39. <i>Chalepotaxis infantilis</i> Gred. Jahrb. D. M. Ges. xi, 167	
40, 44. <i>Cepolis</i> (<i>Cysticopsis</i>) <i>cubensis</i> Pfr. Pilsbry, del. . .	187

FIGURE.	PAGE.
41, 50, 51. <i>Cepolis</i> (<i>Hemitrochus</i>) <i>varians</i> Mke. Pilsbry, del.	188
42, 47. <i>Cepolis</i> (<i>Plagioptycha</i>) <i>salvatoris</i> Pfr. Pilsbry, del.	185
43, 48. <i>Cepolis</i> (<i>Dialeuca</i>) <i>platystyla</i> Pfr. Pilsbry, del.	183
45, 49. <i>Cepolis</i> (<i>Coryda</i>) <i>alauda</i> Fér. Pilsbry, del.	182
46. <i>Cepolis</i> (<i>Hemitrochus</i>) <i>milleri</i> Pfr. After Binney,	188
52. <i>Leucochroa</i> <i>candidissima</i> Drap. Pilsbry, del.	232
53. <i>Spermatheca</i> of same with duct and diverticulum,	232

PLATE 58.

54, 55. <i>Cepolis</i> (<i>Jeanneretia</i>) <i>parraiana</i> Orb. Shepperd, del.	180
56. <i>Cepolis</i> (<i>Eurycampta</i>) <i>bonplandi</i> Lam. Shepperd, del.	181
57. <i>Epiphragmophora</i> (<i>Angrandiella</i>) <i>angrandi</i> Morel. Ser. Conch.	197
58, 59. <i>Epiphragmophora</i> (<i>Pilsbrya</i>) <i>farrisii</i> Pfr. Novit. Conch.	197
60, 61. <i>Epiphragmophora</i> (<i>Pilsbrya</i>) <i>patasensis</i> Pfr. Shepperd, del.	197
62, 63. <i>Epiphragmophora</i> (<i>Helminthoglypta</i>) <i>tudiculata</i> Binn. Terr. Moll. III,	198
64, 65. <i>Epiphragmophora</i> (<i>Monadenia</i>) <i>mormonum</i> Pfr. Shepperd, del.	198
66, 67. <i>Epiphragmophora</i> (<i>Micrarionta</i>) <i>areolata</i> Sowb. Shepperd, del.	197
68, 69. <i>Epiphragmophora</i> <i>cuyana</i> Strob. Novit. Conch.	196
70, 71. <i>Epiphragmophora</i> (<i>Trichodiscina</i>) <i>coactiliata</i> Fér. Shepperd, del.	197
72. <i>Epiphragmophora</i> (<i>Monadenia</i>) <i>fidelis</i> Gray. Shepperd, del.	198
73, 74. <i>Epiphragmophora</i> (<i>Micrarionta</i>) <i>gabbi</i> Newc. Shepperd, del.	197
75. <i>Lysinoe</i> <i>humboldtiana</i> var. Biol. Cent. Amer.	191

PLATE 59.

76. <i>Epiphragmophora</i> <i>nickliniana</i> Lea, atrium everted. Pilsbry, del.	194
77. <i>Epiphragmophora</i> <i>hieronymi</i> Doring. After Kobelt,	196
78. <i>Epiphragmophora</i> <i>semiclausula</i> Mart. Mal. Bl. xv,	196
79. <i>Epiphragmophora</i> (<i>Helminthoglypta</i>) <i>arrosa</i> Gld. After Semper,	194
80. <i>Epiphragmophora</i> <i>areolata</i> Sowb. Pilsbry, del.	197
81. <i>Epiphragmophora</i> (<i>Monadenia</i>) <i>fidelis</i> Gray. Pilsbry, del.	198
82, 86. <i>Epiphragmophora</i> (<i>Monadenia</i>) <i>mormonum</i> Pfr. Pilsbry, del.	194
83. <i>Epiphragmophora</i> <i>nickliniana</i> Lea. Pilsbry, del.	197
84. <i>Epiphragmophora</i> <i>fidelis</i> Gray. Pilsbry, del.	198
85. <i>Epiphragmophora</i> <i>arrosa</i> Gld. Pilsbry, del.	197

FIGURE.

PAGE.

- | | |
|---|-----|
| 87. Epiphragmophora (Helminthoglypta) traskii v. cayama- | |
| censis Hemph. Pilsbry, del. | 197 |
| 88. Epiphragmophora (Helminthoglypta) nickliniana Lea. | |
| Pilsbry, del. | 197 |
| 89. Epiphragmophora (Micrarionta) areolata Sowb. Pilsbry, | |
| del. | 197 |

PLATE 60.

- | | |
|---|-----|
| 1, 2. Ganesella japonica Pfr. Pilsbry, del. | 168 |
| 3, 6. Dorcasia alexandri Gray. Pilsbry, del. | 172 |
| 4. Epiphragmophora areolata Sowb. Pilsbry, del. | 197 |
| 5. Lysinoe humboldtiana Fér. After Binney, | 191 |
| 7. Epiphragmophora nickliniana Lea. Pilsbry, del. | 198 |
| 8. Lysinoe ghiesbreghti Nyst. After Fischer, | 191 |
| 9. Lysinoe eximia Pfr. After Fischer, | 191 |
| 10. Epiphragmophora fidelis Gray. Pilsbry, del. | 198 |

PLATE 61.

- | | |
|---|-----|
| 1-5. Helix (Euparypha) pisana Müll. After Schubert | |
| and Ashford, | 335 |
| 6, 7. Helix (Iberus) muralis Müll. After Schubert, | 329 |
| 8. Helix (Iberus) gualtierana L. After Schmidt, | 329 |
| 9. Helix (Helicogena) asenmis Bgt. After Schubert, | 317 |
| 10. Helix (Levantina) spiriplana v. hierosolyma. After | |
| Schmidt, | 332 |
| 11, 13, 14. Helix (Helicogena) aspersa Müll. After Ashford, | 317 |
| 12. Helix (Helicogena) pomatia L. After Schmidt, | 317 |
| 15. Helix (Helicogena) pomatia L. After Ashford, | 317 |

PLATE 62.

- | | |
|--|-----|
| 16. Helicigona rhætica Mouss. After Schubert, | 296 |
| 17. Helicigona cingulata Stud. After Schmidt, | 296 |
| 18. Helicigona planospira Lam. After Schubert, | 296 |
| 19. Helicigona (Isognomostoma) personata. After Schmidt, | 308 |
| 20. Helicigona lapicida L. After Schmidt, | 298 |
| 21. Helicigona lapicida L., dart. After Ashford, | 298 |
| 22. Helicigona (Arianta) arbustorum L., dart, after Ashford, | 306 |
| 23. Helicigona (Arianta) arbustorum L. After Schmidt, | 306 |
| 24-27. Helicigona (Elona) quimperiana Fér. After Hesse, | 307 |

PLATE 63.

- | | |
|---|-----|
| 1-3. Helix (Iberus) serpentina Fér. After Wiegmann, | 329 |
| 4. Helix (Eremina) desertorum Forsk. After Semper, | 334 |
| 5, 8. Helix (Otala) vermiculata Müll. After Wiegmann, | 323 |

FIGURE.	PAGE.
6. <i>Helix</i> (<i>Eremina</i>) <i>desertorum</i> Forsk. After Jickeli,	334
7. <i>Helicigona</i> (<i>Tacheocampylæa</i>) <i>raspaili</i> Payr. After Moq.-Tand.	305
9. <i>Vallonia pulchella</i> Müller. After Lehmann,	282
10. <i>Vallonia pulchella</i> Müller, dart. After Ashford,	282
11. <i>Acanthinula lamellata</i> Jeffr. After Lehmann,	280
12. <i>Helix</i> (<i>Tachea</i>) <i>nemoralis</i> Müll. Pilsbry, del.	321
13. <i>Helix</i> (<i>Otala</i>) <i>alonensis</i> Fér. After Pfeffer,	323

PLATE 64.

1, 2. <i>Eulota</i> (<i>Euhadra</i>) <i>pelionphala</i> Pfr. After Kobelt,	212
3. <i>Eulota</i> (<i>Euhadra</i>) <i>amaliæ</i> Kob. After Kobelt,	212
4-6. <i>Eulota</i> (<i>Armandia</i>) <i>calymma</i> S. & B. After Boettger,	205
7. <i>Ganesella japonica</i> Pfr. After Kobelt,	168
8. <i>Eulota</i> (<i>Acusta</i>) <i>ravida</i> Bens. After Heude,	203
9. <i>Eulota</i> (<i>Euhadra</i>) <i>quæsitæ</i> v. <i>perryi</i> Jay. Shepperd, del.	212
10-12. <i>Aulacospira scalatella</i> Mlldff. Pilsbry, del.	279
13-15. <i>Eulota</i> (<i>Aegista</i>) <i>oculus</i> Pfr. Shepperd, del.	210
16, 17. <i>Eulota</i> (<i>Plectotropis</i>) <i>mackensii</i> A. & R. Shepperd, del.	208
18, 19. <i>Eulota</i> (<i>Plectotropis</i>) <i>elegantissima</i> Pfr. Shepperd, del.	208
20-23. <i>Eulota</i> (<i>Coccoglypta</i>) <i>pinchoniana</i> Hde. After Heude,	211

PLATE 65.

1, 2. <i>Eulota</i> (<i>Acusta</i>) <i>ravida</i> Bens. Pilsbry, del.	203
3, 4. <i>Eulota</i> (<i>Eulotella</i>) <i>similaris</i> Fér. Pilsbry, del.	203
5, 6. <i>Eulota</i> (<i>Eulotella</i>) <i>duplocincta</i> Mart. After Schacko.	203
7, 8. <i>Eulota</i> (<i>Cathaica</i>) <i>fasciola</i> Dr. (<i>pyrrhozona</i>). Pilsbry, del.	206
9, 10. <i>Eulota</i> (<i>Aegista</i>) <i>platyomphala</i> Mlldff. Pilsbry, del.	210
11, 12. <i>Eulota</i> (<i>Euhadra</i>) <i>quæsitæ</i> <i>perryi</i> Jay. Pilsbry, del.	213
13, 14. <i>Eulota</i> (<i>Plectotropis</i>) <i>vulvivaga</i> S. & B. Pilsbry, del.	208
15-17. <i>Eulota</i> (<i>Cathaica</i>) <i>przewalskii</i> Mart. After Schacko.	206

PLATE 66.

18, 19. <i>Eulota fruticum</i> Drap. After Schuberth,	203
20. <i>Eulota similaris</i> Fér. Pilsbry, del.	203
21-23. <i>Eulota</i> (<i>Acusta</i>) <i>ravida</i> Bens. Pilsbry, del.,	203
24. <i>Eulota fodiens</i> Pfr. After Semper,	203
25. <i>Eulota</i> (<i>Cathaica</i>) <i>przewalskii</i> Mart. After Schacko.	206
26. <i>Eulota</i> (<i>Mastigeulota</i>) <i>kiangsinensis</i> Mart. Pilsbry, del.	211
(<i>vas deferens</i> omitted by lithographer).	
27, 29. <i>Eulota</i> (<i>Euhadra</i>) <i>quæsitæ</i> v. <i>perryi</i> Jay. Pilsbry, del.	213

FIGURE.

PAGE.

- 30, 31. *Eulota duplocincta* Mart. After Schacko. 203
 32. *Eulota* (*Cathaica*) *fasciola* Drap. (*pyrrhizona*). Pilsbry,
 del. 206
 33, 34. *Eulota* (*Plectotropis*) *vulvivaga* S. & B. Pilsbry, del. 208

PLATE 67.

- 1-3. *Helix* (*Tachea*) *nemoralis* L. Pilsbry, del. 321
 4, 5. *Helix* (*Otala*) *vermiculata* Müll. Pilsbry, del. 323
 6, 7. *Helix* (*Iberus*) *serpentina* Fér. After Wiegmann, 329
 8. *Helix* (*Eremina*) *desertella* Jickeli. After Jickeli, 334
 9, 10. *Helix* (*Eremina*) *desertorum* Forsk. After Jickeli, 334
 11. *Helix pomatia* L. Pilsbry, del. 317
 12, 16. *Helicella* (*Trochula*) *terrestris* Penn. After Binney, 262
 13, 14. *Helicella galloi* Kobelt. Pilsbry, del. 245
 15. *Helicella* (*Theba*) *cantiana* Mont. After Binney, 265
 17. *Helicella ericetorum* Müll. After Schubert, 252
 18. *Geomitra abjecta* Lowe. Pilsbry, del. 238
 19, 20. *Leptaxis undata* Lowe. Pilsbry, del. 292

PLATE 68.

- 1-3. *Geomitra delphinula* Lowe. Shepperd, del. 244
 4, 5. *Geomitra* (*Actinella*) *lentiginosa* Lwe. Pilsbry, del. 241
 6. *Geomitra tiarella* Webb & Berth. Pilsbry, del. 244
 7. *Geomitra* (*Callina*) *fausta* Lowe. Pilsbry, del. 241
 8. *Geomitra* (*Discula*) *polymorpha* v. *barbosæ* Pva. After
 Paiva, 242
 9. *Geomitra* (*Discula*) *polymorpha* Lwe. Pilsbry, del. 242
 10, 11. *Geomitra* (*Disculella*) *maderensis* Wood. Pilsbry, del. 243
 12. *Geomitra* (*Hystericella*) *bicarinata* Sowb. Pilsbry, del. 242
 13. *Geomitra* (*Spirorbula*) *obtecta* Lowe. Pilsbry, del. 241
 14, 15. *Geomitra* (*Lemniscia*) *michaudi* Desh. Pilsbry, del. 240
 16-18. *Geomitra* (*Heterostoma*) *paupercula* Lowe. Pilsbry,
 del. 244
 19. *Geomitra* (*Caseolus*) *compacta* Lowe. Pilsbry, del. 242
 20. *Helicella variabilis* Drap. After Moq.-Tand. 248
 21, 22. *Helicella ericetorum* Müll. After Rossmassler, 252
 23, 24. *Helicella* (*Jacosta*) *explanata* Müll. After Hidalgo, 258
 25, 26. *Helicella* (*Theba*) *carthusiana* Müll. After Moq.-Tand. 265
 27. *Helicella* (*Trochula*) *terrestris* Penn. After Hidalgo, 262
 28. *Helicella* (*Candidula*) *candidula* Stud. After Moq.-Tand. 253
 29. *Helicella* (*Cochlicella*) *acuta* (*barbara* L.). After Moq.-
 Tand. 263
 30. *Helicella* (*Platytrocha*) *nummus* Ehrenb. After Bgt. 268

PLATE 69.

FIGURE.		PAGE.
1, 2.	<i>Helicella variabilis</i> Drap. After Schubert,	248
3-5.	<i>Helicella virgata</i> Da Costa. After Ashford,	248
6, 7.	<i>Helicella ericetorum</i> Müll. After Ashford,	252
8.	<i>Helicella ericetorum</i> Müll. After Schubert,	252
9.	<i>Helicella caperata</i> Mont. After Ashford,	254
10.	<i>Helicella candidula</i> Studer. After Schmidt,	254
11.	<i>Helicella mograbina</i> Mor. After Schepman,	260
12.	<i>Helicella tuberculosa</i> Conr. After Schmidt,	261
13.	<i>Helicella striata</i> Müll. After Schmidt,	254
14.	<i>Helicella cantiana</i> Mont. After Ashford,	265
15.	<i>Helicella explanata</i> Müll. After Moq.-Tand.,	258
16.	<i>Helicella syriaca</i> Ehrenb. After Schubert,	265
17.	<i>Helicella nummus</i> Ehrenb. After Schmidt,	268
18.	<i>Helicella elegans</i> = <i>terrestris</i> Penn. After Schmidt,	262
19-21.	<i>Helicella acuta</i> (<i>barbara</i>). After Moss & Paulden, Trans. Manch. Mic. Soc., 1892,	263
22.	<i>Helicella carthusiana</i> Müll. After Schubert,	265

PLATE 70.

23-25.	<i>Zoogenites harpa</i> Say. After Morse,	281
26-28.	<i>Acanthinula aculeata</i> Müll. After Dupuy & Drouet,	280
29.	<i>Vallonia pulchella</i> Müll. After Sterki,	282
30.	<i>Hygromia ciliata</i> Ven. After Moq.-Tand.	276
31.	<i>Hygromia pellita</i> Fér. After Hesse,	276
32.	<i>Hygromia limbata</i> Drap. After Moq.-Tand.,	271
33.	<i>Hygromia hispida</i> Linn. After Schmidt,	273
34.	<i>Hygromia incarnata</i> Müll. After Schmidt,	271
35.	<i>Zoogenites harpa</i> Say. After Morse,	281
36.	<i>Hygromia leucozona</i> Ziegl. After Schubert,	277
37.	<i>Hygromia noverca</i> Friv. After Hesse,	277
38.	<i>Vallonia pulchella</i> Müll. After Sterki,	282
39.	<i>Hygromia cinctella</i> Drap. After Moq.-Tand.	271
40.	<i>Plebecula lurida</i> Lowe. After Binney,	239
41.	<i>Hygromia bidens</i> Chemn. After Schmidt,	278

PLATE 71.

42, 43.	<i>Helicella</i> (<i>Lejeania</i>) <i>scioana</i> Poll. After Pollonera,	267
44.	<i>Helicella</i> (<i>Lejeania</i>) <i>lejeaniana</i> Bgt. After Pollonera,	267
45, 46.	<i>Helicigona rahtii</i> A. Brn. After Sandberger,	310
47, 48.	<i>Helicigona chingensis</i> Klein. Ross del.	310
49.	<i>Helicodonta osculum</i> Thom. After Klika,	289
50.	<i>Cyrtochilus expansilabris</i> Sdb. After Sandberger,	311
51, 52.	<i>Prothelidomus acrochordon</i> Oppenh. After Oppenh.	295
53, 54.	<i>Dentellocaraculus damnatus</i> Sandb. After Oppenh.	295
55, 56.	<i>Fridolinia lucani</i> Tourn. J. de C., 1869,	294

FIGURE.	PAGE.
57, 58. <i>Pseudoleptaxis corduensis</i> . After Sandberger, .	294
59, 60. <i>Helicigona lepidotricha</i> Braun. After Sandberger, .	309
61, 62. <i>Helicigona chaixii</i> Mich. After Sandberger, .	311

SUMMARY. This volume contains 561 figures, illustrating over 300 species of shells, and 571 figures illustrating the anatomy of Helices; a total of 1132 figures. Of these, 330 figures were drawn by the author; 203 other original figures were drawn by Messrs. Wm. and Edw. Shepperd, and about a dozen are from unpublished drawings supplied by friends. The figures of *Flammulina cressida*, *thaisa* and *costulata* Hutton, were drawn by Mr. H. Suter from the type specimens, these species being here for the first time illustrated. The figures of *Plectopylis ponsonbyi* (pl. 40, fig. 9-12), and *Papuina ianthe* (pl. 46, fig. 17-19) are from examples kindly loaned by Mr. John Ponsonby from his collection. The other original figures are from specimens in the collection of the Academy, where also most of the author's dissections—over 500 in number—are preserved.

SECOND SERIES: PULMONATA.

MANUAL

OF

CONCHOLOGY:

STRUCTURAL AND SYSTEMATIC.

WITH ILLUSTRATIONS OF THE SPECIES.

BY GEORGE W. TRYON, JR.

CONTINUATION BY

HENRY A. PILSBRY,

CONSERVATOR OF THE CONCHOLOGICAL SECTION AND PROFESSOR OF MALACOLOGY
IN THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

INDEX TO THE HELICES.

PHILADELPHIA :

Published by Conchological Section
ACADEMY OF NATURAL SCIENCES,
OF PHILADELPHIA.

1895.

THE following Index includes the genera and species monographed in volumes II, III, IV, V, VI, VII, VIII and IX of this series, with the Heliciform or Zonitoid species of Vol. I. It comprises therefore, part or all of the species of the families *Rhytididae*, *Streptaxidae*, *Selenitidae*, *Zonitidae*, *Endodontidae* and *Helicidae*. In short, the reader may reasonably expect to find herein the names of all Heliciform snails originally described under the loose generic term HELIX, as well as all which have a shell of the contour generally associated with, or suggestive of that name. The references give the volume and page upon which each species is described; and in the case of *Endodontidae* and *Helicidae* further reference is given to Volume IX, in which the forms of these families are classified and rearranged.

At the end of this Index will be found a table showing the *dates of publication* of the several parts of the SECOND SERIES of this MANUAL. This is followed by a list of corrections which should be made in volumes II to IX.

This Index may be bound either with Volume IX or as a separate thin volume.

H. A. P.

INDEX TO HELICES

NOTE.—The names of valid species and varieties, are printed in Roman type; The names of genera and other groups in SMALL CAPITALS; the names of all synonyms, whether specific or generic, are printed in *Italic* type.

- | | |
|---|---|
| Abacoensis Mts. v, 20; ix, 186 | <i>Acarnanica</i> Kob. . ix, 319 |
| <i>Abantisorum</i> Serv. . ix, 288 | <i>Acatergastra</i> Péch. . ix, 307 |
| <i>Abax</i> Montr. i, 116. | ACAVINE Pils., IX, xxxii. |
| Abbadiana Bgt. iii, 52; ix, 44 | ACAVUS Montfort, . ix, 153 |
| Abebaia Mab. . ix, 266 | <i>Accedens</i> Hde. . ix, 210 |
| Abebarica Mab. iii, 187. | <i>Accedens</i> Mldff. . ix, 229 |
| Aberrans Mouss. iii, 246; ix, 252 | <i>Accola</i> Mouss. iii, 14; . ix, 234 |
| <i>Abichiana</i> Bayer, . ix, 319 | <i>Accompsia</i> Bgt. iii, 231; ix, 250 |
| <i>Abietana</i> Bgt. iii, 21; . ix, 47 | <i>Accompsiella</i> Anc. . ix, 250 |
| <i>Abietina</i> Paul. . ix, 341 | <i>Accresens</i> Hde. iv, 61; ix, 210 |
| <i>Abjecta</i> Gld. . ix, 77 | <i>Accurata</i> Mouss. iii, 80; ix, 6 |
| <i>Abjecta</i> Lwe., iv, 39; . ix, 242 | <i>Acela</i> Bgt. . ix, 251 |
| <i>Ablennia</i> Bgt. . ix, 260 | <i>Acentromphala</i> Bgt. . ix, 256 |
| <i>Abludens</i> Loc. . ix, 274 | <i>Acerra</i> Bens. ii, 92. |
| <i>Abnormis</i> Pfr. v, 104; . ix, 89 | <i>Acerra</i> Lewis, ii, 197. |
| <i>Abraea</i> Bgt. . ix, 331 | <i>Acetabulum</i> Pse. . ix, 25 |
| <i>Abrochroa</i> Crse. iii, 91; ix, 6 | <i>Achates</i> Z. iv, 93; . ix, 303 |
| <i>Abrolena</i> Bgt. . ix, 325 | <i>Achatina</i> Ben., iv 207; ix, 331 |
| <i>Abromia</i> Bgt. . ix, 331 | <i>Achatina</i> Gray, iii, 165; ix, 145 |
| <i>Abrupta</i> Mts. . ix, 209 | <i>Achatina</i> P. & M. . ix, 303 |
| <i>Abseondita</i> Phil. ii, 175. | <i>Achilles</i> Braz. ii, 218. |
| <i>Abyssinica</i> Jick. ii, 119. | <i>Achilli</i> Bgt. iii, 105; . ix, 268 |
| <i>Abyssinica</i> Jick. iii, 32; ix, 44 | <i>Acies</i> Partsch. ii, 135. |
| <i>Acaica</i> West. . ix, 272 | <i>Aclerochroa</i> Bgt. iii, 181; |
| <i>Acalles</i> Pfr. ii, 177. | [ix, 273 |
| <i>Acanonica</i> Bgt. . ix, 326 | <i>Acmella</i> Pfr. vii, 18; . ix, 140 |
| ACANTHINULA Beck, . ix, 280 | <i>Acorta</i> L. & B. . ix, 272 |
| <i>Acanthinula</i> Cr. iii, 124; ix, 36 | <i>Acosmeta</i> Bgt. . ix, 251 |
| <i>Acanthinulopsis</i> Sut. viii, 61; | <i>Acosmia</i> Bgt. . ix, 256 |
| [ix, 9 | <i>Acris</i> Bens. iii, 74; . ix, 170 |
| ACANTHOPTYX Ancey, ix, 39 | <i>Acrochordon</i> Oppenh. . ix, 295 |
| <i>Acaria</i> Serv. iv, 84; ix, 253 | <i>Acropachia</i> Mab. iv, 114; |
| <i>Acarnanica</i> Kob. viii, 220; | [ix, 305 |
| [ix, 303 | <i>Acrosticha</i> Fisch. . ix, 301 |

- Affinior Deb. viii, 166; . ix, 250
 Affinis Blanc, . . ix, 252
Affinis Gm. iv, 117.
 Affinis Paul. iv, 106; . ix, 362
 Afra Pfr. ii, 109.
 Africæ Brown iii, 108; ix, 38
Africana Pfr. ii, 128.
 Agaetana Mab. iv, 163; ix, 327
 Agapeta Bgt. . . ix, 267
 Agaroi Serv. iii, 229.
 Agenna Bgt. . . ix, 326
 Agenora West. . . ix, 261
 Aggarica B. . . ix, 257
 Aggei Heimb. viii, 244; ix, 220
 Aggerivaga Mab. iv, 255; [ix, 318.
Aglaja Auct. . . ix, 193
Aglaja Alb. . . ix, 191
Aglaja Pfr. ii, 94.
 Aglaometa Mab. iii, 237; ix, 258
 Aglypta Dohrn. ii, 127.
 Agna Hag. . . ix, 256
 Agnata Paul. iv, 107; . ix, 302
Agnata Zgl. . . ix, 263
 AGNATHA Moreh, . ix, xxiii.
 Agnewi Cox, iii, 263; ix, 33
 Agnocheilus Smith, viii, 289; [ix, 142
 Agona Anc. . . ix, 259
 Agreabilis Zgl. iii, 234; ix, 250
 Agriunensis Kob. . ix, 259
Agrestis Lowe. . . ix, 341
 Agrioica Bgt. iv, 9; . ix, 254
 Ahmarina (B.) Mab. iv, 131; [ix, 324
 Aimophila Bgt. iv, 126; ix, 322
 Aimophilopsis Villes, iv 126, [ix, 322
Airunia Siem. . . ix, 304
Aitutakiana Mouss. . ix, 29
 Ajax Pfr. . . ix, 222
 Akowtongensis Theob., iv, [57; ix, 209
 Akrotirensis Kob. . ix, 250
 Alabastra Péch. . . ix, 307
 Alabastrina Paul. iv, 216; [ix, 331
 Alabastrites Mich. iv, 134; [ix, 324
 Alata Pfr. . . ix, 36
 Alauda Fér. v, 42; . ix, 182
 Alavana Bgt. . . ix, 256
 Albaiensis Sowb. vii, 132; [ix, 222
 Alba Kob. . . ix, 326
 Albanensis Cox, ii, 209; viii, pl. 37, f. 43-46, ix, 34, 388
 Albanicus Zgl. ii, 134.
 Albata Blanf. ii, 83; 219.
Albella Dr. . . ix, 259
 Albella Mart. i, 179.
 ALBERSIA H. Adams, . ix, 124
 Albersiana Pfr. v, 17; ix, 186
 Albersi Lwe. iv, 42; ix, 243
 Albersi Mts. ii, 20.
Albersi Pfr. . . ix, 229
Albescens Adami, . . ix, 320
 Albescens Jan. iv, 344; ix, 319
Alberti Brod. . . ix, 227
 Albicans Pfr. ii, 163.
 Albicostis Pfr. iv, 65; ix, 116
 Albida Ad., iii, 218; ix, 169
 Albida Hemph. . . ix, 200
Albida Hemph. viii, 117, ix, 50
 Albida Jeffr. iii, 53; . ix, 281
 Albida Taylor, . . ix, 34
Albidens Bens. ii, 27.
 Albidorsalis Mouss. . ix, 267
 Albidula Bgt. . . ix, 333
Albilabris Lam. . . ix, 93
Albina Anc. . . ix, 26
 Albina Brancsik, . . ix, 157
Albina West. . . ix, 281
 Albinella Paul. ii, 148.
Albinus Grat. . . ix, 229
 Albizonata Dohrn. ii, 86.
 Albocarinata Smith, vii, 59; [ix, 142
Albocincta Binn. . . ix, 68
 Albocincta Ckll. . . ix, 274
 Albocincta Pfr. iii, 86; ix, 4
 Albocinctella Colb. . ix, 254
Albofasciata Hemph. viii, [116; ix, 50
Albofilata Mouss. . ix, 134
 Albolabris Hedl. viii, 289; [ix, 142
 Albolabris Say, iii, 150; ix, 76

- Albolineata* Gld. . . ix, 68
Albopicta Mart. ii, 50.
Alboranensis Pfr. iii, 224 ;
 [ix, 337
Alboranensis Webb. & Berth
 [ix, 336
Albostriata Mouss. . . ix, 6
Albozonata Binn. . . ix, 68
Albula Le Guill. . . ix, 141
Albulana (B.) Serv. . . ix, 307
Albula Sterki. . . ix, 283
Albumenoidea Cox, ii, 169.
Albus Jeffr. ii, 153.
Alcarazana Guir. iv, 147 ;
 [ix, 325
Aleyone Kob. iv, 134 ; ix, 324
Alderi Gray, ii, 173.
Alexandra Cox, . . ix, 283
Alexandri Fbs. . . ix, 28
Alexandri Gray, iii, 213 ; ix, 173
Alexandrina Fag. iii, 11 ; ix, 234
Alexandrina Parr. . . ix, 268
Alfieriana Sol. ii, 51.
Alfredi Cox, vii, 12 ; . ix, 140
Algira Chier, . . ix, 262
Algiris L. ii, 134.
Alia West, . . ix, 304
Alibrandi Rig. iii, 238.
Alicea Gupp. iii, 101.
Alicie Pils. viii, 152 ; . ix, 78
Alicurensis Ben. ii, 145.
Aliena Zieg. . . ix, 44
Alifaensis Paul. iv, 92 ; ix, 301
Aliostoma West. iii, 120 ; ix, 288
Allasteri Cox, vii, 106 ; ix, 220
Allecta Cox, ii, 210.
Alleniana Pva. iv, 45 ; ix, 243
Allerya Bgt. . . ix, 46
Alleryana Cr. ii, 119.
Alleryi Paul. ii, 196.
Alliacea Jeffr. ii, 145.
Alliaria Müll. ii, 145.
Alligans C. B. Ad. iii, 6 ; ix, 64
Alligans Rve. . . ix, 64
Allisteri Pils. . . ix, 220
Allochroida Sut. viii, 63 ; ix, 9
ALLODISCUS Pilsbry, ix, 14
ALLOGNATHUS Pils. ix, 290
ALLOLEMUS Pils. . . ix, 315
Allporti Legr. iii, 263 ; ix, 13
Alluvionum Serv. iii, 251,
 [iv, 19 ; ix, 256
Almæ Mildff. vii, 117 ; . ix, 219
Almonteana F. & C. . . ix, 199
Almonte Tristr. . . ix, 199
Aloagana Jous. v, 139 ; ix, 94
Alonensis Fér. iv, 146 ; ix, 325
Alpestris Cl. . . ix, 278
Alpestris Sut. viii, 99 ; . ix, 32
Alpestris Z. iv, 118 ; . ix, 307
Alphabucelliana Paul. iii,
 [204 ; ix, 265
Alpha Pfr. . . ix, 30
Alphæa Let. . . ix, 275
Alphonsi Dh. iv, 61 ; . ix, 210
Alpicola Fér. . . ix, 307
Alpicola Stab. iv, 10 ; . ix, 254
Alpicola West, . . ix, 302
Alpina Johnston, . . ix, 34
Alpina F.-B. iv, 100 ; . ix, 302
Alsia Bgt. iii, 177 ; . ix, 273
Alsophila Phil. iv, 78 ; . ix, 198
Alta Pse. iii, 73 ; . ix, 6
Attenana Gartn. . . ix, 267
Atteniana Klees, iii, 175.
Alternata Say, iii, 57 ; . ix, 50
Alticola Mildff. . . ix, 337
Alticola Nev. . . ix, 250
Altilis Sterki, . . ix, 283
Altispira (Dohrn) Mts., ix, 191
Altispira Pils. . . ix, 78
Aluta Alb. iii, 46.
Alutacea Paul. iv, 206 ; ix, 331
Alutacea West, . . ix, 304
Alutacea Zgl. . . ix, 97
Alveare Pfr. iii, 7 ; . ix, 64
Alveolata Beck, . . ix, 64
Alveolus Gass. ii, 216 ; ix, 33
Alveolus Hde. . . ix, 169
Alveus C. B. Ad. iii, 98 ; ix, 57
Alybensis Kob. iv, 130 ; ix, 324
Amabilis C. B. Ad. . . ix, 89
Amalie Kob. vi, 105 ; . ix, 213
Amalie Mildff. viii, 245 ; ix, 228
Amancaensis Hid. iii, 22.
Amanda Rm. . . ix, 259

- Amathia* Bgt. . . ix, 302
Amazonica Hupé. . . ix, 167
Amazonica Pfr. v, 186; ix, 167
Amazonicus Dohrn, i, 66
Ambicincta Mart. . . ix, 204
Ambielina Charp., Pal. ix, 257
Ambigua C. B. Ad. iii, 9; ix, 64
Ambigua Gmel. . . ix, 141
Ambigua (Parr) Mss. iv, 244; ix, 319
Amblasmodon Mab. iv, 179; [ix, 328
Ambliostoma Parr. . . ix, 288
Ambloxa L. & B. . . ix, 257
Amblygonia Reinh. iii, 52; [ix, 44
Amblytropis Sdb. . . ix, 295
Amboinensis Mart. ii, 170.
Amboinensis Mart. . . ix, 119
Ambrosia Aug. vii, 7; ix, 140
Ambrosia Strobel, . . ix, 303
Ambusta Anc. iii, 229.
Amella Bgt. . . ix, 275
Amela Bgt. ii, 143.
Amethysta Let. & Bgt. ix, 250
Amicta Rve. vii, 133; ix, 222
Amicula Bgt. . . ix, 257
Ammederana L. & B. . . ix, 251
Ammiralis Pfr. vi, 117; ix, 214
Ammonia, Val. ii, 16.
Ammoniformis Orb. i, 65.
Ammonis Schm. iii, 245; ix, 252
AMMONITELLA Cooper, ix, 80
Ammonitoides Braz. . . ix, 35
Ammonitoides Rve. i, 115; [ix, 34
Ammonoceras Pfr. i, 65.
Amoena Pfr. vii, 98; ix, 215
Amœnula Beck. ii, 115.
Amoma Bgt. . . ix, 250
Amorgia West, . . ix, 303
Amori Hid. v, 183; ix, 167
AMPELITA Beck, . . ix, 155
Amphibola Bgt. . . ix, 257
Amphiconus Malz. viii, 180; [ix, 259
Amphicyrta Bgt. . . ix, 234
Amphidroma Mart. ii, 33.
- AMPHIDOMA* Albers, . ix, 39
Amphidoma Hutton, . ix, 17
Amphizona Pils. vii, 5; ix, 139
Ampla Pfr. . . ix, 68
Ampla Reinh. ii, 178.
Amplecta Gundl. v, 35; ix, 185
Amplexus Brown, . ix, 282
Ampullarioides Rv. ii, 16.
Amuniensis Mts. . . ix, 248
Amurensis Gerstf. . ix, 281
Amurensis Sterki, . ix, 283
Anacardium Dohrn. vi, 238; [ix, 104
Anachoreta W. G. B. . ix, 199
Anadyomene A. & A. vii, [110; ix, 220
Anaglyptica Rv. . . ix, 240
Analogica Pse. iii, 63; ix, 26
Anaphora West, . . ix, 319
Anasia Bgt. . . ix, 257
Anasina Serv. . . ix, 275
Anatolica Kob. . . ix, 320
Anauniensis de Bett. iv, 105; [ix, 301
Anax Bens. iii, 157; ix, 148
Anceps Gld. ii, 23.
Anceyana Grt. viii, 96; ix, 26
Anceyia Pils. iii, 102.
Anceyi Bgt. ii, 51.
Anceyi Mlldff. viii, 215; ix, 207
Anchistoma Adams, ix, 69, 284
Anchistoma v. Mart. ix, 93
Anconæ Gent. iv, 106; ix, 302
Anconæ Iss. iii, 192; ix, 265
Anctostoma Mts. iv, 244; ix, 319
Ancylochila Cr. iv, 55; ix, 209
Andalusica Kob. viii, 160; [ix, 254
Andamanensis Try. ii, 93.
Andersoniana Nev. ii, 112.
Andersoni Cless. . . ix, 204
Andersoni Cox, vi, 157; ix, 133
Andersoni W. Blf. iii, 161; [ix, 146
Andicola Pfr. v, 189; ix, 166
Andium Phil. ii, 207.
Andorrica Bgt. . . ix, 299
Andræi Bttg. ii, 141.

- | | |
|---|--|
| <i>Apiculata</i> Anc. viii, 95; ix, 25 | <i>Arbustorum</i> L. iv, 117, . ix, 306 |
| <i>Apiculiformis</i> Anc. . ix, 263 | <i>Arcadica</i> Parr. . ix, 303 |
| <i>Aplodon</i> Raf. . ix, 69 | <i>Arcasiana</i> C. & D. iii, 206; [ix, 205] |
| <i>Aplomorpha</i> Jonas, viii, 11; [ix, 228 | <i>Arcasiana</i> Serv. ii, 159. |
| <i>Aplostoma</i> Moq. ii, 10. | <i>Arceuthophila</i> Mab. . ix, 256 |
| <i>Apocrypta</i> Fag. ii, 158. | <i>Arceuthophila</i> Mab. iv, 30. |
| <i>Apollinis</i> Mts. . ix, 252 | <i>Archezonites</i> Sand. ii, 10. |
| <i>Apollo</i> Pfr. v, 79; . ix, 98 | <i>Archelix</i> Alb. . ix, 322 |
| <i>Aporata</i> Bgt. . ix, 275 | <i>Archimedeia</i> Ben. . ix, 266 |
| <i>Aporina</i> Silva, . ix, 275 | <i>Architectonica</i> Braz. . ix, 34 |
| <i>Appeliana</i> Mouss. iv, 85; ix, 304 | <i>Arcinella</i> Lwe. . ix, 241 |
| <i>Appelii</i> Kob. iv, 105; . ix, 302 | <i>Arcta</i> Lwe. iv, 38; . ix, 241 |
| <i>Appelinsi</i> Auct. . ix, 304 | <i>Arctispira</i> Pfr. iii, 47; . ix, 41 |
| <i>Appendiculata</i> Pfr. vi, 163; [ix, 134 | <i>Arctispira</i> West. ii, 171. |
| <i>Appenina</i> Stabile, . ix, 322 | <i>Arctistria</i> Pfr. iv, 82; . ix, 181 |
| <i>Applanata</i> Mldff. iv, 59. | <i>Arcuata</i> Pfr. viii, 296. |
| <i>Appressa</i> Say, iii, 148; . ix, 77 | <i>Arcuata</i> (Vitrinoconus) Pfr. iii, [46 |
| <i>Appressispira</i> Anc. . ix, 260 | <i>Arcuata</i> Zgl. iii, 234; . ix, 250 |
| <i>Appropinquata</i> Marts. iii, 82; [ix, 5 | <i>Ardens</i> Anc. iii, 238. |
| <i>Approximata</i> Guill. iii, 90; [ix, 6 | <i>Ardesa</i> , Bgt. . ix, 266 |
| <i>Aprica</i> Kr. iii, 107; . ix, 38 | <i>Ardouini</i> Dh. . ix, 142 |
| <i>Aprutitiana</i> Fag. . ix, 256 | <i>Ardua</i> Cox, ii, 181. |
| <i>Apuana</i> Iss. iv, 105; . ix, 303 | <i>Arecibensis</i> Pfr. iii, 58; ix, 58 |
| <i>Apuana</i> Mab. . ix, 266 | <i>Arelatensis</i> Loc. . ix, 256 |
| <i>Apula</i> Blanc. iv, 219; . ix, 332 | <i>Arenaria</i> Ohv. . ix, 266 |
| <i>Aquila</i> Cox, i, 172. | <i>Arenaria</i> Zgl. . ix, 263 |
| <i>Aquila</i> H. Ad. . ix, 207 | <i>Arenarum</i> Bgt. . ix, 250 |
| <i>Aquitania</i> Bon. ii, 151. | <i>Arenosa</i> Z., Rm. . ix, 252 |
| <i>Arabie</i> Fagot, ii, 158. | <i>Arenicola</i> Lwe. iv, 45; . ix, 243 |
| <i>Arabica</i> Roth. . ix, 335 | <i>Arenicola</i> Tate, iii, 52; . ix, 34 |
| <i>Arabica</i> Terv. iv, 139; . ix, 325 | <i>Arenivaga</i> Mab. . ix, 249 |
| <i>Arachne</i> Morel. . ix, 38 | <i>Areolata</i> Sowb. iii, 228; ix, 200 |
| <i>Aradasii</i> Piraj. iii, 223; ix, 250 | <i>Arfakiensis</i> Tap. Can. . ix, 171 |
| <i>Aranea</i> Behn. . ix, 26 | <i>Arga</i> Mab. iv, 17. |
| <i>Araneatela</i> Hde. iv, 59; ix, 210 | <i>Arganica</i> Serv. . ix, 256 |
| <i>Aranea</i> Parr. iii, 31. | <i>Argentarolæ</i> Paul., iv, 223; [ix, 332 |
| <i>Arangiana</i> Poev. . ix, 93 | <i>Argentea</i> Rve. ii, 22. |
| <i>Arata</i> Blf. ii, 23. | <i>Argentellei</i> Kob. iv, 94; ix, 303 |
| <i>Arata</i> Sowb. viii, 267; . ix, 104 | <i>Argentina</i> Strob. i, 66. |
| <i>Arayatensis</i> Semp. i, 184. | <i>Argia</i> Bgt. iii, 12; . ix, 234 |
| <i>Arbana</i> L. & B. . ix, 250 | <i>Argillacea</i> Fér. iii, 210; ix, 122 |
| <i>Arborea</i> Say, ii, 161. | <i>Argoderma</i> Bgt. . ix, 257 |
| <i>Arboreoides</i> Ad. . ix, 64 | <i>Argoderma</i> L. & B. iv, 19. |
| <i>Arboretorum</i> Val. . ix, 199 | <i>Argonautula</i> W. & B. iv, 42; [ix, 259 |
| <i>Arbusticola</i> Dh. iii, 222, ix, 170 | <i>Arguta</i> Pfr. ii, 45. |

- Ariadne* Pfr. iii, 132; . ix, 74
Arianensis Bgt. iii, 253; ix, 259
ARIANTA Leach, . ix, 305
Ariantina West. . ix, 256
Arichensis Deb. iv, 137; ix, 324
Aridorum Cox, vi, 266; ix, 122
Ariel Hutt. viii, 59; . ix, 9
Arietina Rossm. . ix, 337
Arigoi Bgt. . ix, 250
Arigonis Rm., iii, 241; . ix, 250
Arionta Mart. . ix, 305
Arionta of Authors; . ix, 193
ARIOPHANTA Desm. ii, 5, 15.
Aristata Kryn. iii, 201; ix, 272
Arista Westerl. . ix, 331
Arkansaënsis Pils. viii, 156; [ix, 76
ARMANDIA Anc. . ix, 205
Armata Stab. . ix, 272
Armeniaca Bay. . ix, 249
Armeniaca Pfr. iv, 86; . ix, 304
Armida Pfr. ii, 46.
Armigera Anc. viii, 155; ix, 76
Armillata Lowe, iv, 15; ix, 254
Armitageana Lwe. iii, 223; [ix, 240
Armoricana Bgt. iii, 242; ix, 250
Arnotti Bens. ii, 87.
Arnusiaca Fag. iv, 17.
Arnusi Serv. . ix, 257
Arpatschiana Mss. iii, 177; [ix, 266
Arridens Lwe. iv, 40; . ix, 241
Arrosa Gld. iv, 72; . ix, 199
Arrouxi Bgt. iv, 12; . ix, 254
Arrowensis Le Guill, vii, [34; ix, 141
Artara L. & B. . ix, 251
Artensis Souv. ii, 168.
Arthuriana Cox, vi, 159; ix, 134
Arthurii Pfr. iii, 48.
Artificiosa Bens. iii, 33.
Artonilla Hagenm. . ix, 257
Aruensis Tap.-Can., ii, 170; 220
Arundinetorum Hde. iii, 207; . ix, 204
Arusalensis Hagenm. . ix, 305
Aruensis Pini. . ix, 266

- Atomata* Gray, . . . ix, 164
Atomata Mke. iv, 21; . ix, 258
Atopa Alb. . . ix, 147
Atramentaria Sh. i, 127.
Atrata Pfr. v, 144; . ix, 94
Atrata Rv. . . ix, 94
Atricolor Aust. ii, 92.
Atrocincta Bgt. . . ix, 319
Atrofusca Alb. ii, 43.
Atrofusca Pfr. vi, 285; . ix, 112
Atrolabiata Kr. iv, 124; ix, 332
Atropos Fér. vi, 20; . ix, 157
Atrorubra Less. ii, 73.
Attasensis Morel. . ix, 255
Attegia Bens. ii, 52.
Attica Bttg. . . ix, 255
Attrita Lwe. iv, 46; . ix, 243
Atypa Bttg. viii, 187; . ix, 266
Auberi Orb. v, 11; . ix, 187
Aubiniana Bgt. . . ix, 204
Aubryana Hde. iv, 60; . ix, 210
Aucapitainiana Bgt. iii, 29.
Aucklandica Le Guill. . ix, 13
Audebardi Pfr. v, 74; . ix, 100
Audeberti Mouss. vi, 67; ix, 153
Audouini Orb. iv, 81 . . ix, 198
Augustiana Bgt. . . ix, 257
Auklandica Guill. . ix, 13
Aulacognatha Mörch. . ix, xxiii
Aulacophora Anc. viii, 138; ix, 38
Aulacopus Pfr. ii, 8.
AULACOSPIRA Mlldff. . ix, 279
Aulacospira (Rhytida) Pfr. [iii, 35
Aulica Pfr. ii, 73.
Aulopsis Bens. ii, 215.
Aurantia Mart. ii, 73.
Aurata Sowb. vii, 170; . ix, 221
Aurea Mart. ii, 89.
Aureedensis Braz. viii, 282; [ix, 134
Auricoma Fér. v, 62; . ix, 97
Auriculata Say, iii, 137; ix, 73
Auriculata Swains. . ix, 108
Auriculina Petit. . ix, 95
Auriformis Bld. iii, 137; ix, 73
Aurigerana Fag. . . ix, 256
Auris Pfr. ii, 16.
Aurita Mart. vi, 281; . ix, 111
Aurora Pfr. vii, 41; . ix, 142
Aurulenta Beck, ii, 124.
Austenianus Nev. i, 175.
Austeni Blf. ii, 23.
Austera West. . . ix, 331
Australis Chem. . . ix, 64
Australis Hutt. i, 126.
Australis Mke. . . ix, 340
Australis Rve. i, 181.
Austriaca Mühl. . . ix, 322
Austrinus Cox, iii, 264; ix, 13
AUSTROCHLORITIS Pilsbry, [ix, 121
Avara Say, iii, 136; . ix, 73
Avarica Serv. . . ix, 273
Avellana Fér. . . ix, 182
Avellana Lwe. iv, 187; . ix, 239
Avenionensis Bgt. . . ix, 257
AVERELLIA Ancey, . ix, 197
Avia West. . . ix, 248
Avus Pfr. vi, 210; . ix, 104
Axia Bgt. . . ix, 324
Axina Alb. . . ix, 223
Axiotheata Bgt. . . ix, 251
Axonana Mab. iii, 185; ix, 275
Ayresiana Newe. iv, 70; ix, 199
Azona Andr. . . ix, 254
Azona Gredl. viii, 158.
Azonata Hedl. viii, 293; ix, 164
Azonata Hedl. viii, 294; ix, 164
Azorella Bgt. . . ix, 326
Azorica Alb. iv, 196; . ix, 293
Azorica Mouss. . . ix, 341
Azpeitia Hid. viii, 199; ix, 280
Babondubii Parr. . ix, 249
Bacca Pfr. vi, 112; . ix, 214
Baccata Hutt. i, 179.
Bacchica Mart. . . ix, 303
Baccueti Bgt. . . ix, 275
Baconi Bens. ii, 59.
Bactriana Hutt. iii, 212; ix, 204
Bactricola Guppy. iii, 55; ix, 57
Badia Fér. v, 86; . ix, 91
Badiella Zgl., Bgt. . ix, 274
Badigerensis Fag. . ix, 256

- Bathurstensis Smith, . ix, 343
 Bathycampa Mab. iv, 157; [ix, 327
 Bathyclera Mab. iv, 172; ix, 327
 Bathyceele M. & P. viii, 139; [ix, 38
 Bathycoma Mab., iv, 153; ix, 327
 Bathylkema Bgt. iv, 130; ix, 324
Bathymophora=bathmophora.
 Bathyoniphala Charp, . ix, 252
 Bathytera Blanc, iii, 251.
 Bathytera Bl. & W. . ix, 252
 Bathyteropsis Anc. iii, 251.
 Bathyteropsis Serv. . ix, 252
 Baudinensis Smith, viii, 286; [ix, 114
 Baudini Dh. ii, 80.
 Baudoni Petit. ii, 208.
 Bavariana West, . ix, 275
 Bavayi Crosse, i, 114; . ix, 20
 Bayamensis Pfr. v, 64; ix, 97
 Bayensis Braz. vi, 166; viii, [282; ix, 134
Bayerii Parr. . ix, 304
 Baylei (Lecoq) Moq. . ix, 307
 Bazini Cr. i, 121; . ix, 33
 Bazzettæ Poll. ii, 220.
 Beadlei Pils. viii, 176; . ix, 248
 Beata Woll. iii, 123; . ix, 289
 Beatricis Tap.-Can. vi, 260; [ix, 120
Beatrix Ang. vii, 15; ix, 140
 Beaudouini Loc. . ix, 274
 Beaumieri Mouss. iv, 149; [ix, 325
 Bebias Braz. vi, 175; ix, 134
 Becasis Ramb. iii, 176; ix, 273
 Beccarii Jick. iii, 189; ix, 268
 Beckiana Pfr. iii, 86; ix, 4
 Beckianus Pfr. i, 173.
 Beddomæ Braz. vi, 174; ix, 134
 Beddomei Blf. ii, 38.
Beddomei Braz. viii, 147.
Bednalli Braz. vi, 130; ix, 131
Beguirana Auct. . ix, 324
 Beguirensis Deb. iv. 135; ix, 324
 Behri Gabb. iii, 134; . ix, 74
Beilanica West. . ix, 319
 Belangeri Dh. ii, 80.
Belangeri Rve. ii, 80.
 Belcheri Pfr. ii, 207.
 Belcheri Pfr. viii, 35; . ix, 230 [344
 Belemensis Serv. . ix, 256
 Bella Pfr. ii, 68.
 Bellardii Mouss. iv, 231; ix, 333
 Bellendenkerensis Braz. vi, [161; ix, 134
 Bellengenensis Braz. iii, 87.
 Bellengerensis Cox, vi, 140; [ix, 131
 Belli Cox, iii, 25; . ix, 34
 Belloquadrica Mab. iv, 17; [ix, 256
 Bellovacina Mab. . ix, 275
 Bellucciana Bgt. . ix, 264
Bellula Poey, . ix, 185
 Belmorei Cox, iii, 76; . ix, 5
 BELOGONA Pils., IX, xxxiii.
 BELOGONA EUADENIA, ix, 175
 BELOGONA SIPHONADENIA, [ix, 235
 Beloni Jous. . ix, 224
 Bembicodes Pfr. vii, 198; ix, 227
 Benedicta Kob. iv, 92; . ix, 302
 Benguetensis Semp. vii, 96, [ix, 215
 Benigna Pfr. iii, 84; . ix, 4
 Bennetiana Nev. . ix, 322
 Bennetti Braz. vi, 135; ix, 122
 Benoiti Caf. iii, 233; . ix, 250
 Benoiti Cr. & F. ii, 90.
 Benoiti Villa ii, 189.
 Bensoni Busch. ii, 23.
 Bensoni Pfr. i, 182.
 BENSONIA Pfr. ii, 8, 107.
 Benthencourtiana Sh. iv, [151; ix, 327
 Beraudi Gass. i, 117.
 Berbruggeriana Loc. . ix, 275
 Berendti Pfr. ii, 204.
 Berenice Kob. viii, 185; ix, 261
 Berkeleyi Lwe. iv, 186; ix, 328
 Berlandieriana Moric. iv, [76; ix, 68
 Berlieri Cr. iii, 59; . ix, 27

- Berlieri Morl. iii, 236; . ix, 250
 Bermudensis Pfr. iii, 95.
Bermudia Anc. iii, 267.
 Bernsteinii Mart. . . ix, 112
Bertelliana Adami. iv, 101.
 Bertheloti Fér. . . ix, 288
 Bertheloti Lwe. . . ix, 258
 Bertheri Bgt. . . ix, 324
 Bertholdiana Pfr. iii, 102; [ix, 341
 Bertina Bgt. . . ix, 251
 Bertiniana Canef. iii, 78.
 Berytensis Fér. iii, 194; ix, 266
 Besckeii Dkr. ii, 165.
Beta Pfr. . . ix, 30
 Beta Pfr.=globosa Sut. ix, 33
 Betsileoensis Ang. vi, 61; ix, 152
 Bevani Braz. viii, 292; ix, 141
Bewsheri Ad. ii, 25.
 Bewsheriana Morel. ii, 21.
 Bhamoensis Nev. iv, 54; ix, 209
 Bianca Hutt. viii, 97; ix, 32
 Bianconii Dh. iii, 32; ix, 47
 Biangulata Pfr. ii, 46.
 Biangulosa Mts. iii, 178; ix, 259
 Bibanensis Anc. . . ix, 260
 Bicallosa Friv. iii, 171; ix, 279
Bicallosula Hde. . . ix, 287
 Bicarinata Semp. ii, 46.
 Bicarinata Sowb. iv, 33; ix, 242
 Bicarinatus Semp. i, 174.
 Biciliata Pfr. ii, 67.
 Bicincta Ben. . . ix, 266
 Bicincta Dub. iv, 250; ix, 320
Bicincta Mke. v, 49; . ix, 180
 Bicincta Pfr. iv, 75; . ix, 191
 Bicingulata Bttg. . ix, 304
Bicingulata Smith, vi, 63; [ix, 152
 Bicolorata Lea, vii, 199; ix, 227
 Bicolor Beck i, 174.
Bicolor Hemp. viii, 118; ix, 50
Bicolor Lam. ii, 24.
Bicolor Lwe. . . ix, 240
 Bicolor Marts. iii, 82; . ix, 5
Bicolor Pfr. ii, 29.
 Biconecava Hde. iii, 117; ix, 287
 Biconecava Pfr. i, 130; viii, 104. [ix, 32
 Biconvexa Mart. vi, 281; ix, 111
Bicostata Pfr. ii, 199.
 Bicururis Pfr. iii, 136; . ix, 74
Bidentalis Lam. . . ix, 327
Bidentata Dkr. . . ix, 254
Bidentata Gm. . . ix, 279
 Bidenticulata Bens. iii, 69.
Bidentifera Phillips, . ix, 288
 Bidens Chemn. iii, 170; ix, 279
 Bidinensis Caf. iii, 189; ix, 272
Bidwilli Cox (Bul.), . ix, 141
 Bidwilli Pfr. vii, 55; . ix, 142
 Bielzi Schm. . . ix, 278
 Bifaria West., . . ix, 272
 Bifasciata Burrow, v, 129; [ix, 190
Bifasciata Gmel. . . ix, 141
Bifasciata Lea, . . ix, 215
 Bifilaris Dohrn, ii, 52.
 Bifilaris Hde. ii, 218.
 Biforis Hde. iii, 166; . ix, 145
 Biformis Beck, . . ix, 276
 Bifoveata Bens. vi, 245; ix, 124
 Bifrons Lowe ii, 205.
 Bifurcata Desh. v, 170; ix, 95
 Bigonia Fér. vi, 226; ix, 109
 Bigoti Crosse, ii, 128.
Bigsbyi Tryon, . . ix, 116
 Bijuga Stöl. ii, 22.
Bilabiata Oliv., . . ix, 287
Bilamellata Pfr. . . ix, 23
 Bilamellata Sowb. viii, 91; [ix, 28
 Bilaticincta Mart. . . ix, 204
 Bilineata Aust. ii, 102.
 Bilineata Pfr. ii, 187.
 Bilirata Blf. ii, 56.
Bilirata Gredl. ii, 56.
 Billeana Hde. iii, 209; ix, 204
 Billeana Mörch, iii, 84; ix, 4
 Billeheusti Cr. & Fisch., ii, 177.
 Bilottiana L. & B. . . ix, 250
 Bimaensis Mouss. ii, 71.
Binarginata Gray, . . ix, 266
 Binaria Pfr. iii, 61; . ix, 25

- Binneyana Morse ii, 162, 201.
 Binneyana Pfr. iii, 48; ix, 41
 Binneyi Hemph. viii, 116; [ix, 50
 Binodata Mlldff. iii, 124; ix, 287
 Binominata Tryon, iii, 146; [ix, 76
 Bintuanensis Hid. vi, 237; [ix, 104
 Bintuanensis Hid. viii, 134; [ix, 4
 Biocheana Crosse, ix, 140
 Biomphala Pfr. vi, 244; ix, 119
 Bipartita Fér. vi, 126; ix, 132
 Bipartita Pils. vii, 201; ix, 227
 Bipartita Woll. iv, 40; ix, 241
 Biplicata Sowb. viii, 92; ix, 28
 Biretracta Mouss. ii, 208; ix, 34
 Birmana Pfr. ii, 92.
 Birmanicus Phil. i, 177.
 Birta Let. & Bgt. ix, 251
 Bisbicincta Mart. ix, 204
 Biscalpta Hde. vi, 9; ix, 290
 Bischoffensis Bedd. viii, 109; [ix, 34
 Bisculpta Bens. iii, 105; ix, 38
 Bislingensis Semp. ii, 105.
 Bistrialis Beck, ii, 83.
 Bisulcata Pfr. iii, 87.
 Biteniata Cox, vi, 144; ix, 131
 Biteniata Mlldff. viii, 221; [ix, 204
 Bituberculata Fér. ix, 288
 Bituberculata Pfr. v, 154; [ix, 94
 Bituberculata Rv. ix, 94
 Bituminosa Mab. iv, 184; ix, 328
 Bizona Gredl. ix, 170
 Bizona Mart. ix, 192
 Bizona Rossm. iv, 106; ix, 301
 Bizonalis Desh. v, 127; ix, 93
 Bizonalis Grat. ix, 182
 Bizonia H. & A. Ad. ix, 109
 Blackalli Braz. vi, 264; ix, 122
 Blackmani Cox, vi, 137; ix, 122
 Blainvilleana Lea, ii, 44.
 Blainvillei Le Guill, vii, 25; [ix, 141
 Blakeana Newc. vi, 306.
 Blakeana Tate ii, 166.
 Blakei Kob. vi, 306.
 Blanchetiana Moric. ix, 190
 Blanci Bgt. ix, 326
 Blanci Poll. viii, 150; ix, 287
 Blanda Cox, vii, 21; ix, 140
 Blandi Hemph. ix, 76
 Blandi Weinkl. iii, 8; ii, 199; [ix, 65
 Blandiana Ad. v, 41; ix, 183
 Blanfordiana H. Ad. vii, [26; ix, 141
 Blanfordi H. Ad. ix, 141
 Blanfordi Theob. ii, 129.
 Blasi Serv. ix, 256
 Blauneri Shuttlew. ii, 149.
 Bleicheri Palad. iv, 132; ix, 324
 Blidabensis Bgt. ii, 153.
 Blomfieldi Cox, vi, 154; ix, 133
 Blondiana Bgt. ii, 158.
 Blossura L. & B. ix, 250
 Boa Hupé, ix, 166
 Bocageana Cr. vi, 112; ix, 200
 Bocagei Paiva, ix, 294
 Boettgeriana Mlldff. vii, 181; [ix, 225
 Boettgeri Hilb, i, 253.
 Boettgeri Kob. iv, 211; ix, 330
 Boettgeri Mlldff. viii, 134; [ix, 4
 Boetzkesi Mill. ix, 167
 Bofilliana Fag. ix, 275
 Boghariensis Deb. iv, 129; [ix, 324
 Bogotensis Pfr. v, 176; ix, 96
 Boholensis Brod. viii, 26; ix, 229
 Boholensis Pfr. ii, 46.
 Boholensis Semper, ix, 337
 Boissieri Charp. iii, 14; ix, 234
 Boissieria M. T. ix, 307
 Boissyi Terv. iii, 254; ix, 259
 Boivini Petit, vii, 6; ix, 140
 Bollei Alb. iv, 194; ix, 294
 Bollenensis Loc. viii, 170;
 Bombax Bens. i, 66. [ix, 250
 Bombayana Grat. ii, 80.
 Bombycina Pfr. i, 252.

- Bonaldai Adami, . . ix, 252
 Bonduelliana Bgt. iv, 140;
 [ix, 325
 Bonouiensis Stef. . . ix, 252
 Bonplandi Lam. iv, 82; ix, 181
 Boothiana Pfr. iii, 97; . ix, 58
 Boraborensis Grt. iii, 66; ix, 26
Boraborensis Pse. . . ix, 26
 Borbonica Dh. iii, 206; ix, 205
 Bordaensis Ang. vi, 192; ix, 129
 Borealis Cless. ii, 172.
Borealis Hde. . . ix, 171
 Borealis Mldff. viii, 119, 133;
 [ix, 4
 Borneensis Pfr. i, 178.
 Borneensis Pfr. ii, 29.
 Bornii Pfr. v, 127; . ix, 93
Bortana Serv. . . ix, 253
 Boryana Morel. ii, 218.
 Bosce Hid. iii, 118; . ix, 288
Bosciana Fér. . . ix, 190
 Bosnensis Kob. iv, 88; ix, 300
 Bosnensis Mldff. . . ix, 278
 Bosniaca Bttg. iii, 115; ix, 287
Bosnica Bgt. viii, 231.
 Botteri Parr. ii, 139.
 Boucardi Ang. . . ix, 191
 Boucourti Morel. ii, 89.
 Boudriesa Let. & Bgt. . ix, 251
 Bougainvillei Pfr. vi, 128;
 [ix, 121
 Bounobœna Orb. i, 64.
 Bourailensis Gass. ii, 167.
 Bourcierii Pfr. v, 156; . ix, 94
Bourcierii Rv. . . ix, 94
 Bourdillonii Theob. vii, 127.
 Bourguignatiana Mab. & Le
 [M. ii, 120
 Bourguignati Pfr. iii, 204;
 [ix, 272
 Bourkensis E. A. Sm. vi, 308;
 [ix, 131
 Bourniana Bgt. iii, 268; ix, 273
 Bouryi Morg. iii, 172; . ix, 170
 Bousqueti Deb. . . ix, 250
 Bouthyana, Pech. . . ix, 307
 Bouvieri Morel. iii, 46.
 Bouyeri Cr. & Fisch. ii, 219.
 Bowdichiana Fér. iv, 187;
 [ix, 239
Boxalli Sowb. . . ix, 212
Boydii Ang. i, 119.
 Boyeri C. & F. vii, 47; ix, 140
 Brachydiscus G.-Aust. iii,
 [162; ix, 146
 Brachylasia S. & B. viii,
 [194, ix, 209
 Brachyodon Sowb. viii, 267;
 [ix, 104
 Brachyplecta Bens. iii, 163;
 [ix, 145
 Bracteola Fér. . . ix, 58
Bradybæna Beck, . . ix, 202
Bradybæna L. & B. . ix, 257
Bradygyra Fag. . . ix, 257
 Braluma G.-Aust. iii, 164;
 [ix, 145
 Brandtii Kob. vi, 101; . ix, 214
 Braidensis Poll. . . ix, 254
 Brardiana Pfr. iii, 210; ix, 204
 Brazieræ Braz. vii, 43; ix, 142
 BRAZIERIA Ancey, . ix, 29
 Brazieri Cox, i, 171.
 Brazieri Cox, iii, 24; . ix, 34
 Brazilianiana Fér. v, 184; ix, 167
 Bredeana Deb. . . ix, 324
Brenchleyi Ang. . . ix, 140
Brenchleyi Braz. vii, 16; ix, 140
Brenoensis Muhl. . . ix, 300
 Brenskei Bttg. iv, 113; ix, 303
 Breveti Deb. viii, 169; . ix, 250
 Brevicula Pfr. viii, 45; . ix, 231
Breviculus Rve. . . ix, 229
 Brevibarbis Pfr. iii, 221; ix, 169
 Brevidens Pfr. vi, 272; ix, 124
 Brevieri Pech. iv, 139; . ix, 325
 Brevior C. B. Ad. iii, 99; ix, 58
 Brevipila Pfr. vi, 265; . ix, 122
 Brevis C. B. Ad. iii, 9; . ix, 64
 Breviseta Pfr. vi, 268; ix, 124
 Brevispira H. Ad. viii, 208;
 [ix, 206
Breweri Newc. ii, 161.
 Briandi Serv. . . ix, 267
 Briaræa B. . . ix, 257
Bridayi Branc. . . ix, 302

- | | |
|--|---|
| <i>Bridgesii</i> Newe. . . ix, 199 | <i>Brunnescens</i> Mldff. viii, 82; . ix, 35 |
| <i>Bridgesii</i> Try. . . ix, 199 | <i>Brunonis</i> Kob. . . ix, 342 |
| <i>Bridwilli</i> Pfr. . . ix, 142 | <i>Brusinae</i> Stoss. iv, 98; . ix, 302 |
| <i>Brigantina</i> Meng. iii, 204; . ix, 272 | <i>Bryanti</i> Harp. iii, 43; . ix, 48 |
| <i>Brinophila</i> Loc. iv, 18. [ix, 272 | <i>Bryanti</i> Pfr. iv, 83; . ix, 181 |
| <i>Brittanica</i> West. . . ix, 274 | <i>Bryaræa</i> Bgt. iv, 19. |
| <i>Broadbenti</i> Braz. vi, 176; . ix, 134 | <i>Bryodes</i> Shuttlew. ii, 164. |
| <i>Brocardiana</i> Dut. iv, 112; . ix, 305 | <i>Byrophila</i> Ph. iii, 42; . ix, 41 |
| <i>Broechiana</i> Calc. . . ix, 47 | <i>Bryse</i> Marés, . . ix, 336 |
| <i>Broechii</i> Calc. ii, 158. | <i>Buccata</i> Hde. ii, 216. |
| <i>Broechii</i> Mayer, . . ix, 311 | <i>Buccinella</i> Rv. iii, 23; . ix, 32 |
| <i>Brocha</i> Bgt. . . ix, 326 | <i>Bucculenta</i> Gld. iii, 153; ix, 77 |
| <i>Brocheri</i> (Gut.) Pfr. v, 55; . ix, 189 | <i>Bucculenta</i> Tap.-Can. vi, [195; ix, 155 |
| <i>Brocheroi</i> Arango, . . ix, 189 | <i>Buchholzi</i> Bgt. ii, 128. |
| <i>Brodie</i> Braz. vii, 10; . ix, 140 | <i>Buchii</i> Dub. iv, 238; . ix, 319 |
| <i>Broderipi</i> Pfr. vii, 123; . ix, 220 | <i>Buddæ</i> Hilb. viii, 208; ix, 206 |
| <i>Broderipi</i> Rve. . . ix, 219 | <i>Buddiana</i> C. B. Ad. v, 7; ix, 67 |
| <i>Broemmeri</i> Kob. viii, 229; . ix, 303 | <i>Buelowi</i> Malz. viii, 236; ix, 330 |
| <i>Brondeli</i> Bgt. iii, 255; . ix, 259 | <i>Buffoniana</i> Pfr. . . ix, 192 |
| <i>Bronni</i> Pfr. v, 112; . ix, 90 | <i>Bukowicanica</i> Brus. . ix, 301 |
| <i>Bronni</i> v. β Pfr. . . ix, 90 | <i>Bulacanensis</i> Hid. vi, 226; . ix, 109 |
| <i>Brookei</i> A. & R. ii, 17. | <i>Bulbina</i> Dh. . . ix, 76 |
| <i>Broti</i> d' H. & D. . . ix, 104 | <i>Bulbulus</i> Mouss. vi, 258; ix, 120 |
| <i>Brotii</i> Bonn. ii, 71. | <i>Bulbus</i> Mke. iii, 213; . ix, 173 |
| <i>Broughami</i> Ang. vi, 146; ix, 131 | <i>Bulbus</i> Mouss. . . ix, 120 |
| <i>Brouni</i> Sut. viii, 102; . ix, 32 | <i>Bulina</i> Less. . . ix, 344 |
| <i>Browneana</i> Pfr. v, 109; ix, 90 | <i>BULIMINOPSIS</i> Heude. . ix, 171 |
| <i>Brownii</i> Pils. v, 29; . ix, 184 | <i>Buliminoides</i> Hde. iv, 31; . ix, 171 |
| <i>Browningii</i> Bens. viii, 136; . ix, 38 | <i>Buliminus</i> Hde. iv, 32; ix, 171 |
| <i>Brucei</i> Jick. iii, 52; . ix, 44 | <i>Bulimoides</i> Moq. . . ix, 264 |
| <i>Bruguieriana</i> Pfr. vii, 166; . ix, 224 | <i>Bullacea</i> Pfr. i, 124. |
| <i>Bruijii</i> Tap.-Can. ii, 219. | <i>Bulla</i> Pfr. ii, 37. |
| <i>Brundusiana</i> Fag. . . ix, 256 | <i>Bullula</i> Hutt. ii, 64. |
| <i>Bruneri</i> Anc. viii, 119; ix, 50 | <i>Bullula</i> Brod. . . ix, 229 |
| <i>Brumalis</i> M. & D. ii, 160. | <i>Bulveriana</i> Lwe. . . ix, 243 |
| <i>Brumeriensis</i> Förbes, vii, 52; . ix, 142 | <i>Bulverii</i> Wood, iv, 42; . ix, 243 |
| <i>Bruniana</i> Gass. i, 119; . ix, 54 | <i>Buphthalmus</i> Fér. ii, 29. |
| <i>Brunii</i> Mörch. iii, 74. | <i>Burdigalensis</i> Grat. . ix, 249 |
| <i>Brunnea</i> Porro. . . ix, 319 | <i>Burella</i> L. & B. . . ix, 251 |
| <i>Brunnea</i> Aut. ii, 113. | <i>Burini</i> Bgt. iv, 141; . ix, 325 |
| <i>Brunnea</i> Sowb. . . ix, 223 | <i>Burnerensis</i> Smith, . . ix, 343 |
| | <i>Burnupi</i> M. & P. viii, 140; ix, 38 |
| | <i>Burailensis</i> G.-Aust. ii, 65. |
| | <i>Bursatella</i> Gld. iii, 71; ix, 24 |

- Burtinii Dh. iv, 48; . ix, 204
 Buruensis Mart. . . ix, 119
 Busbyi Gray, i, 126.
Buschi Pfr. . . ix, 229
 Bussacona Silv. . . ix, 44
 Bustoi Hid. vi, 230; . ix, 109
Bustoi Hid. . . ix, 229
 Butleri Pfr. vii, 188; . ix, 225
Buttoni Hemph. viii, 117; [ix, 50
 Buvigneri Dh. viii, 212; ix, 206
 Buvignieri Mich. iii, 121; [ix, 288
 Buxetorum Bgt. . . ix, 267
 Buxina Heude. . . ix, 343
 Buxtoni Braz. vi, 265; ix, 122
 Byssina Gredl. . . ix, 272

 Cabriti Gass. i, 113.
 Caeista Bgt. . . ix, 257
 Cacopera Mab. iv, 172; ix, 327
 Cacopista Mab. iv, 158; ix, 327
 Cacoplasta Mab. iv, 159; ix, 327
 Cacumenifera Bens. ii, 57.
Cadaverosus Pils. vi, 19; ix, 156
 Caduca Pfr. ii, 186.
 Caducior Rv. ii, 32.
 Cæca Guppy, iii, 55; . ix, 57
 Cæcilia Pfr. ii, 210.
 Cæcoides Gupp. iii, 55; ix, 57
 CÆLATURA Pfr. ii, 5, 21.
 Cælata Stud. iii, 175; . ix, 273
 Cælatina Loc. . . ix, 273
 Cælestis Let. & Bgt. . ix, 251
 Cæmentitia Sh. iv, 20, ix, 258
Cænatoria Held. . . ix, 316
 Cænotera M. & P. viii, 135.
 Cærulescens Ang. vii, 68; ix, 142
 Cæsa Cox, iii, 261; . ix, 10
 Cæsareana Parr. iv, 227; ix, 333
 Cæsar Pfr. viii, 15; . ix, 228
 Cæsia Pfr. ii, 86.
 Caffra Fér. i, 131; viii, 135.
 Caficii Ad. . . ix, 260
 Caharica Aust. ii, 92.
 Cahuzaci Bgt. . . ix, 256
 Caidis Anc. . . ix, 272
Cailletti Crs. iii, 216; . ix, 131
 Cailliaudi Dh. vii, 144; ix, 222
 Cailliaudi Petit. . . ix, 231
 Calabarica Pfr. ii, 51.
 Calabrica Kob. iv, 243; ix, 320
 Calabrica Paul, ii, 150.
 Calacala Weinl. v, 29; ix, 184
 Calacaloides Pils. v, 28; ix, 184
 Calæca Fag. . . ix, 322
 Calamechroa Jonas, ii, 127.
 Calamianica Q. & M. . ix, 231
 Calaritana Paul, . . ix, 264
 Calathoides Paiv. iii, 44; ix, 51
 Calcaræ Arad. & Mag. ii, 190.
 Calcarata Ben. iv, 28; ix, 263
 Calcarea Högb. iv, 118; ix, 306
 Calcarea Mouss, . . ix, 258
 Calcarina Anc. iii, 238.
Calcarina Moq. . . ix, 232
 Calcar Mart. vi, 221; . ix, 108
Calcigena Lwe. iv, 45; ix, 243
 Calculina Pfr. iii, 125; ix, 83
 Calculosa Gld. ii, 49.
Calculus Hde. . . ix, 209
 Calculus Lwe. iv, 39; ix, 242
Calculus Pfr. . . ix, 83
 Caldeirarum M. & D. iv, [196; ix, 293
 CALDWELLIA Ad. ii, 6, 27.
 Caldwelli Barc. ii, 27, 218.
 Caldwelli (Barcl.) Bens. iii, 27
 Caledonica Crosse, i, 116.
 Calias Bens. ii, 109.
 Calida Kob. viii, 167; . ix, 250
 Californiensis Lea, iv, 119; [ix, 199
 Calista Brod. viii, 24; ix, 228
 Callestha Béreng. . ix, 256
Callicochlias Ag. . . ix, 222
 Callifera Pfr. ii, 114.
Calligera Dub. . . ix, 322
 CALLINA Lowe, . . ix, 241
 Calliope Cr. iii, 36; . ix, 33
Calliostoma A. & R. . ix, 337
 Callipona Mab. iv, 160; ix, 327
 Callirhoë Rolle, . . ix, 325
 Callistoderma L. & B. ix, 260
 Callizona Cr. vi, 105; ix, 213
 Callojuneta West. . ix, 288

- Callojunctis* Pils. . ix, 200
Callopisticus Bgt. ii, 173.
Callosa Ant. iii, 259.
Calobapta Jonas, viii, 46 ;
 [ix, 231
CALOCOCHLEA Hartmn. ix, 222
Calographa West. . ix, 251
Calomorpha Jonas, v, 142 ;
 [ix, 94
Calopsis Bgt. viii, 165 ; ix, 250
Calostrophæ Anc. . ix, 83
Calpeana Mor. iii, 120 ; ix, 288
Calpica Kob. ii, 158.
Calpis Bens. iii, 52.
Caltabellotensis Kob. viii,
 [232 ; ix, 331
Calva Gld. ii, 110.
Calva Kob. iv, 91 ; . ix, 301
Calva Lwe. iv, 41 ; . ix, 240
Calymma Schm. & Bttg. ix, 205
Calymna Hutton, . ix, 18
Calymnia Mts. viii, 179 ; ix, 254
Calypso Ben. . ix, 331
Calypso Brod. viii, 25 ; ix, 229
Calypso Parr. . ix, 255
Calypso Pfr. vi, 28 ; . ix, 157
CAMÆNA Alb. . ix, 101
CAMÆNELLA Pils. . ix, 105
CAMENINE . . ix,
 [xxxii
Cambojiensis Rv. ii, 18.
Camelina Bgt. ii, 154.
Camelopardalis Brod. viii,
 [25 ; ix, 229
Canelus Pfr. vi, 237 ; ix, 109
Camena Mart. . ix, 101
Camerani Less. . ix, 288
Camerata Mouss. iii, 232 ; ix, 250
Camille Cox, . ix, 34
Campana Tib. iv, 243 ; ix, 319
Campanica Paul, . ix, 266
Campanula Pfr. vi, 236 ; ix, 104
Campbelliana Pils. vi, 39 ;
 [ix, 157
Campbellica Filh. iii, 102 ;
 [ix, 9
Campbelli Gray, iii, 72.
Campelica Mab. vi, 54 ; ix, 157
Campesina Ezq. . ix, 325
Campestris Zgl. . ix, 255
Campochilus Pils. viii, 201 ;
 [ix, 169
Campoensis Fag. . ix, 257
Camprodunica Kob. iv, 118 ;
 [ix, 307
Campylæa Beck, . ix, 299
Campylonota Tap.-Can. ii, 217
Camura Bens. ii, 130.
Caná Bgt. . ix, 251
Canalifera Ant. iii, 118 ; ix, 288
Canalis Grt. iii, 39 ; . ix, 35
Canariæ Mouss. ii, 156.
Canariensis Mouss. . ix, 259
Canariensis Sh. . ix, 249
Candaharica Pfr. iii, 247 ;
 [ix, 249
Candeloti C. & M. i, 122.
Candescens C. B. Ad. v, 117 ;
 [ix, 90
Candicans Auct. iii, 244 ;
 [ix, 252
Candida Gm. ii, 17.
Candida Porro. . ix, 252
Candida Rm. iv, 247 ; ix, 320
Candida Spix, i, 61.
Candidissima Drap. iii, 10 ;
 [ix, 234
CANDIDULA Kob. . ix, 253
Candidula Stud. iv, 10 ; ix, 254
Candiota Friv. iii, 234 ; ix, 250
Candisata Mke. . ix, 242
Canescens Ad. & Rv. iii,
 [214 ; ix, 200
Canicalensis Lwe. iv, 188 ;
 [ix, 240
Canigonensis Boub. . ix, 307
Canigonica Fag. . ix, 307
Canina Anc. viii, 177 ; ix, 250
Canini Ben. ii, 147.
CANISTRUM Mörch. . ix, 230
Canovarii Tap.-Can. vii, 26 ;
 [ix, 141
Canovasiana Serv. . ix, 256
Cantabrica Hid. iv, 110 ; ix, 254
Cantabrica Paul. iv, 91 ; ix, 301
Cantæ (B.) Serv. . ix, 326

- CANTAREUS Risso, . ix, 318
Canthareus Agas. . ix, 316
 Cantiana Mont. iii, 192; ix, 266
 Cantianiformis Bgt. . ix, 266
 Cantoriana Bens. iii, 83; ix, 4
 Capensis Pfr. iii, 103; ix, 37
 Caperata Mont. iv, 14; ix, 254
 Caperatus Gld. i, 171.
 Capessens Bens. ii, 132, 220.
 Capillacea Fér. i, 125.
Capillacea Pfr. ii, 185.
 Capitanea Pfr. ii, 72.
 Capitium Bens. iii, 74; ix, 170
 Capnodes W. G. Binn. ii, 183.
 CAPRINUS Montf. . ix, 90
 Capsella Gld. ii, 162.
 Capsella Lwe. iv, 41; . ix, 241
 Capsula Bens. ii, 176.
 Capuana Bgt. iv, 30: . ix, 263
 Capusi Villes. . ix, 272
 Caputspinulæ Rv. iii, 102;
 [ix, 33
Carabinata Fér. . . ix, 148
 Cara C. B. Ad. v, 107; ix, 89
Caracolina Auct. . . ix, 284
 Caracolla Linn. v, 120; ix, 93
Caracolla Schum. . ix, 92
Caracolla Turton, . ix, 298
 CARACOLLINA Beck, . ix, 288
 CARACOLUS Montf. . ix, 92
 Caræ Cantr. iv, 216; . ix, 331
 Carascalensis Fér. vi, 103;
 [ix, 254
 Carascaloides Bgt. iii, 193;
 [ix, 272
 Carascalopsis Fag. iv, 104;
 [ix, 257
 Carbonaria Sowb. vii, 163;
 [ix, 224
 Carcharias Pfr. vi, 189; ix, 136
 Carusiaca Mab. iv, 17; ix, 256
 Cardiobola Mab. iv, 173;
 [ix, 327
 Cardiotoma Kob. iii, 219;
 [ix, 169
 Cardonæ Hid. iii, 258; ix, 259
Carduelis Reib. . . ix, 204
 Carfaniensis Stef. . ix, 265
 Caribæa Weiml. v, 26; ix, 184
 Caricus Roth, ii, 135.
 Carinaria Mlldff. . ix, 337
 Carinata Bgt. . . ix, 333
 Carinata Braz. . ix, 34
 Carinata H. & J. vii, 36; ix, 141
 Carinata Lea, viii, 22; ix, 228
 Carinata Streb. ii, 188.
Carina Wood, . . ix, 155
Carinifera Ad. . . ix, 207
 Carinifera Semp. viii, 220;
 [ix, 204
 Carinifera Stol. ii, 54.
 Cariosa Oliv. iii, 13; . ix, 234
 Cariosula Mich. iii, 13; ix, 234
 Carmeliensis Pfr. ii, 158.
 Carmelita Fér. v, 99; ix, 89
 Carmelita Tristr. iii, 198.
Carnea Hemph. viii, 117; ix, 50
 Carneola Grat. viii, 19; ix, 228
 Carneola Pfr. ii, 94.
Carnicolor Orb. . . ix, 189
Carnicolor Pfr. . . ix, 184
Carnina Chier. . . ix, 250
 Carniolicus Schm. ii, 136.
 Caroli D. & H. iii, 258; ix, 259
 Carolinensis Lea, viii, 153;
 [ix, 77
Carolus Dh. . . ix, 227
 Caroni Dh. iv, 29; . ix, 262
Carosina Serv. iv, 84; ix, 253
 Carotæ Bgt. iii, 31. . ix, 44
 Carotii Paul. ii, 189.
 Carotii Paul. iv, 112; . ix, 305
Carpatia Friv. . . ix, 272
 Carpensoractensis Fag. ix, 251
 Carpenteriana Bld. . ix, 73
 Carpenteri Newc. iv, 71; ix, 199
 Carpetana Hid. . . ix, 47
Carpiensis L. & B. . ix, 336
 Carrarensis Porro. iv, 105;
 [ix, 301
Carseolana Fér. . . ix, 332
 Carsoliana Fér. iv, 219; ix, 332
 Carta Mab. iv, 166; . ix, 327
 Cartereti Smith, ii 40.
 Carthageniensis Rossm. ix, 325
Carthusiana Kob. . ix, 264

- Carthusiana Müll. iii, 195 ;
 [ix, 266
 Carthusianella Dr. . ix, 266
 CARTHÆA Hutton, . ix, 339
 Caruanæ Kob. viii, 174 ; ix, 250
 Caruanæ Pils. iv, 208 ; ix, 330
 CARYODES Albers, . ix, 161
 Caryx Bens. iii, 75 ; . ix, 4
 Casca Gld. ii, 110.
 CASEOLUS Lowe, . ix, 242
 Casertana Bgt. . ix, 250
 Casertana Paul. iv, 91 ; ix, 301
 Casus Pfr. iv, 59.
 Caspari Mlldff. vi, 115 ; ix, 214
 Caspia Bttg. ii, 158.
 Cassandra Hutt. viii, 66 ; ix, 15
 Cassandra Pfr. vi, 147 ; ix, 131
 Cassida Hutt. i, 175.
 Cassidula Bens. ii, 177.
 Cassinensis Paul. iv, 91 . ix, 301
 Cassiniensis Smith, . ix, 343
 Cassiquiensis Newc. ii, 175.
 Casta Pfr. vii, 120 ; . ix, 219
 Castanea Bttg. . ix, 304
 Castanea Hemph. viii, 116 ;
 [ix, 50
 Castanea Hemph. . ix, 76
 Castanea Hemph. . ix, 200
 Castanea Müll. ii, 80.
 Castanea Oliv. iv, 239 ; ix, 319
 Castanea Rm. iv, 111 ; . ix, 301
 Castaneolabiata Aust. ii, 101.
 Castaneola Hde. ii, 122.
 Castaneus Pfr. i, 169.
 Castelnaudii Hupé, . ix, 167
 Castelnavi Pfr. . ix, 167
 Castelneaudii D. & H. v,
 [193 ; ix, 167
 Castor Theob. ii, 129.
 Castra Bens. iii, 84 ; . ix, 4
 Castrens Pfr. v, 59 ; . ix, 97
 Castroiana Serv. . ix, 257
 Catarella Mab. vi, 49 ; . ix, 156
 Catarota Bgt. . ix, 251
 Catarotella Bgt. iii, 239.
 Catenifera Pfr. v, 191 ; ix, 166
 Catenulata Anc. viii, 261 ; ix, 166
 Catenulatu Muhl. . ix, 303
 Cateucta Mab. iv, 158 ; . ix, 327
 CATHAICA Mlldff. . ix, 205
 Cathara West, . ix, 320
 Catharolena Bgt. ix, 326.
 Cathcartæ Reeve, iv, 51 ; ix, 337
 Catinus Bens. . ix, 145
 Catinus Pfr. iii, 74 ; . ix, 5
 Catletti Braz. ii, 123.
 Catocyphia Bgt. iii, 256 ; ix, 336
 Catodonta (B.) Pech. . ix, 324
 Catoleia Bgt. . ix, 272
 Catoleius Bgt. ii, 137.
 Catostoma Bens. iv, 62 ; ix, 209
 Catskillensis Pils. . ix, 48
 Caturigia Paul. . ix, 256
 Caucasica Mouss. . ix, 274
 Caucasica Parr. . ix, 249
 Caucasica Pfr. . ix, 304
 Caudefacta Let. & Bgt. ix, 251
 Causia Bens. iii, 102.
 Cauta West. iii, 240 ; . ix, 250
 Cavannæ Paul. ii, 144.
 Cavannæ Paul, iii, 259 ; ix, 259
 Cavarella Serv. ii, 143 ; ix, 275
 Cavata Mouss. iv, 252 ; ix, 320
 Cavernula Garr. . ix, 24
 Cavernula H. & J. iii, 69 ; ix, 24
 Cavimargo Mart. . ix, 204, 259
 Cayennensis Pfr. ii, 182.
 Caymanensis Mayn. viii,
 [241 ; ix, 183
 Cazenavetti F. & B. vi, 35,
 [302 ; ix, 157
 Cebuana Mlldff. . ix, 215
 Cecillei Phil. vi, 109 ; . ix, 214
 Cedretorum Deb. iii, 179 ; ix, 273
 Celebens Pfr. i, 178.
 Celebens Pfr. ii, 79.
 Celia Hutt. viii, 60 ; . ix, 9
 Cellaria Müll. ii, 155.
 Celinde Gray, ii, 211 ; . ix, 16
 Celsa Pse. . ix, 25
 Cemenalea Risso, iii, 193 ; ix, 266
 Cenestinensis Cr. & Deb. iv,
 [216 ; ix, 331
 Cenisia Charp. . ix, 254
 Centralis Beck, ii, 105.
 Centralis Mouss. ii, 41.

- Cepaea* Held. . . ix, 320
Cepa Müll. v, 93; . . ix, 180
Cephalonica Mouss. iii, 118; [ix, 288
Cepoides Lea, vii, 194; . ix, 226
CEPOLIS Montf. . . ix, 177
Ceramensis Pfr. vi, 249; ix, 119
Ceraria Bens. ii, 41.
Cerasina Gredler, . . ix, 212
Cerasina Sh. . . ix, 318
Cerata Cox, . . ix, 133
Ceratodes Pfr. ii, 105.
Ceratomma Pfr. iv, 231; ix, 333
Cerea Cox, . . ix, 133
Cerea Gld. ii, 128.
Cerea Pfr. iii, 106.
Cerea Hedl. . . ix, 142
Cerealis Cox, . . ix, 5
Cerealis Crosse, i, 114; . ix, 20
Cereolus Mühlf. iii, 128; ix, 73
Ceres Pfr. vi, 239; . ix, 104
Cerigottana Bttg. . . ix, 277
Cerina Morel. vi, 57; . ix, 158
Cerinoidea Anth. ii, 197.
Cernica H. Ad. ii, 28.
Cernua Mts. viii, 263; . ix, 173
Ceroconus Pfr. iii, 75.
Ceroides Pfr. iii, 47; . ix, 41
Ceromatica Morel. ii, 97.
Certa Bgt. . . ix, 251
Cespitoides Fisch. viii, 176; [ix, 250
Cespitum Drap. iii, 241; ix, 250
Cesticulus Gundl. v, 33; ix, 185
Cestus Bens. iii, 206; . ix, 204
Ceylanica Pfr. ii, 84.
Ceylanicus Beck, i, 177.
Ceyssoni Bgt. . . ix, 267
Chaixii Mich. . . ix, 311
Chalcidica Bl. iii, 24, 231; [ix, 250
Chalcophila Orb. i, 63.
CHALEPOTAXIS Ancey, . ix, 167
Challameliana Bgt. . ix, 275
Challisi Cox, vi, 173; . ix, 134
Chamæleon Parr. iv, 101; ix, 302
Chambardi L. & B. . ix, 336
Chambertinii Tryon, ii, 39.
Chamissoi Pfr. ii, 116.
Chancei Cox, vii, 5; . ix, 139
Chaperi West. . . ix, 341
Chapmani Cox, vii, 51; ix, 142
Chapmanni Anc. . . ix, 340
Charieia Pech. iv, 136; . ix, 324
Chariessa Pils. vi, 279; . ix, 111
Charmesiana L. & B. . ix, 250
CHAROPA Albers, . ix, 31
Charopa Hutton, . ix, 17
Charopide Hutt. ix, xxxi.
Charpentieri Pfr. iii, 156; ix, 148
Charpentieri Schol. . ix, 302
Charybdis Bens. iii, 108.
Charybdis Mörch. . ix, 82
Chastellii Fér. ii, 76.
Cheesemani Suter, . ix, 338
Cheffana Bgt. iii, 199; . ix, 272
Cheilodon Say, Bld. . ix, 73
Cheilostropha d'Orb. iii, [128; ix, 83
Cheiranthicola Lwe. iv, 46; [ix, 243
Cheiri Less. vi, 241.
Chelia Bgt. ii, 156.
Chelonites Cr. i, 117; . ix, 20
Chelydea West. . ix, 271
Chennitziana Pfr. v, 104; ix, 89
Chennelli G.-A. ii, 66.
Chenni Pfr. ii, 38.
Cheratomorpha Tap. Can. [vi, 245; ix, 119
Cherraensis Blanf. ii, 129.
Cherraensis G.-Aust. ii, 62.
Chersa Bgt. ii, 220.
Chersa Mab. iv, 153; . ix, 327
Chersinella Dall. ii, 161.
Chersonesica Kob. iii, 194.
Chersonesica Mühl. . ix, 259
Chevalieri Soul. ii, 42.
Chix Fag. . . ix, 257
Chiapensis Pfr. iii, 138; ix, 74
Chilembia Bgt. . . ix, 335
Chillhowënsis Lewis, iii, [155; ix, 76
Chiliensis Mühl. iii, 42; ix, 340
Chilodon Ehrenb. . ix, 284
Chilogymnus Ehrenb. . ix, 286

- Chilostoma* Fitz. . ix, 282
CHILOSTOMA Fitz. . ix, 299
Chilotrema Leach. . ix, 298
Chimmoi Pfr. ii, 210.
Chimotrema Raf. . ix, 69
Chinensis Hde. . ix, 219
Chinensis Phil. iv, 60; . ix, 210
Chinensis Voigt. . ix, 103
Chioidea Bgt. . ix, 251
Chionodiscus Pfr. iii, 11; ix, 234
Chiophila Bgt. iv, 110. ix, 302
Chiron Gray, viii, 77; . ix, 18
Chittyana C. B. Ad. v, 108; [ix, 89
CHLORÆA Albers, . ix, 214
Chlorata Lwe. . ix, 293
CHLORITIS Beck, . ix, 117
Chloritis Semp. . ix, 212
Chloritoides Pils. vi, 267; ix, 122
Chlorochroa Sowb. vii, 150; [ix, 223
Chlorogrammica Val. . ix, 225
Chloroleuca Mart. . ix, 229
Chloroplax Bens. iii, 74.
Chlorotieus Pfr. ii, 136.
Chlorozona Grat. vi, 31; ix, 157
Chnoodia Bgt. iii, 179; . ix, 273
Choelotricha Bgt. . ix, 302
Choinix Bens. ii, 96.
Choiseulensis Braz. vii, 16; [ix, 140
Chola Pech, iii, 198; . ix, 260
Chondrodes Strub. viii, 292; [ix, 141
Chonomphala Bgt. . ix, 259
Chonomphala Bgt. . ix, 273
Chordata Pfr. ii, 215; . ix, 16
Choreta Bgt. iii, 231; . ix, 250
Chorismenostoma Bl. & W. [ix, 44
Chorista (B.) Serv. . ix, 326
Choristochila Bttg. iv, 102; [ix, 303
Chottica Anc. . ix, 324
Christianæ Theob. i, 176; ii, 112
Christinæ H. Ad. viii, 213; [ix, 207
Christophi Bttg. iv, 251; ix, 320
Christyi Bld. iii, 151; ix, 77
Chromatocochlius Ag. ix, 226
CHROMATOSPILERA Pilsbry, [ix, 221
Chromochila Pils. v, 15; ix, 186
Chromocochlea Hartm. . ix, 226
Chrysæme Q. & M. . ix, 223
Chrysalidiformis Sby. viii, 51; [ix, 231
CHRYSTALLIS Alb. . ix, 231
Chrysocheila Sowb. . ix, 222
Chrysochila Sowb. vii, 138; [ix, 222
Chrysodon Anc. . ix, 91
Chrysomela Pfr. iv, 198; ix, 293
Chrysosticta Morel. ii, 127.
Chrysostomi Rolle, . ix, 333
Chrysotricha Bttg. viii, 190; [ix, 273
Chthamalolena Bgt. . ix, 260
Chydopsis (Bgt.) Péch. . ix, 326
Cine Kl. . ix, 337
Cidaris Gray, ii, 36.
Cidaris Lam. ii, 72.
Cicatricosa Müll. vi, 198; ix, 103
Cicerenla Fér., Dh. . ix, 68
Cicercula Gld. ii, 116.
Cigenda Mont. . ix, 336
Ciliata Morel. . ix, 268
Ciliata Suter, . ix, 338
Ciliata Ven. iii, 187; . ix, 276
CILIELLA Mouss. . ix, 275
Ciliosa Pfr. iv, 55; . ix, 209
Cimex Pfr. ii, 170.
Cincinna Sowb. viii, 16; ix, 228
Cincinnatiiformis Sby. viii, 18; [ix, 228
Cincinnatius Rve. . ix, 165
Cincta Lea, ii, 82.
Cincta Lewis, viii, 152; ix, 78
Cincta Müll. iv, 245; . ix, 319
Cincta Mlldff. ii, 103.
Cincta Perry, . ix, 189
Cinctella Dr. iii, 187; . ix, 271
Cinctoinflata Mouss. iv, 47; [ix, 204
CINERACEA H. & J. vii, 77; [ix, 143

- Cineracea Semp. vii, 168; ix, 224
Cinerarea Rouss. . . ix, 143
Cinerascens Pfr. vii, 197; ix, 227
Cinerascens Andr. . . ix, 320
Cinerea Lwe. iv, 45; . ix, 243
Cinerea Poir. . . ix, 204
Cinerosa Pfr. viii, 15; . ix, 228
Cingalensis Bens. ii, 58.
Cingulata Held. . . ix, 302
Cingulata Hedl. viii, 288; [ix, 142
Cingulata Stud. iv, 104; ix, 301
Cingulella Zgl. iv, 104; ix, 302
Cingulifera Held. . . ix, 299
Cingulina DeBet. iv, 106.
Cingulina Dh. . . ix, 303
Cinnamomea Val. ii, 89.
Ciofoloi Cafic, . . ix, 331
Circassica Mouss. iii, 195; ix, 272
Circe Pfr. vii, 142; . ix, 222
Circinaria Beck, . . ix, 282
Circinnata Stud. . . ix, 274
Circulus Pfr. iv, 61; . ix, 210
Circumcarinata Stearns, iv, [70; ix, 199
Circumcincta Reinh. ii, 178.
Circumdata Fér. vi, 246; ix, 119
Circumdata Mühl. . . ix, 6
Circumflaris Morel ii, 55.
Circumfirmata Redf. iii, 9, viii, [55; ix, 65
Circumlineata Küst. ii, 157.
Circumornata Fér. iv, 222; [ix, 182
Circumornata Kob. . . ix, 331
Circumornata Mts. . . ix, 332
Circumpiata Mouss. ii, 72.
Circumplexa Fér. i, 64.
Circumsessa Shuttlew. ii, [160; ix, 48
Circumtexta Fér. . . ix, 180
Cirtæ Terv. . . ix, 324
Cisalpinæ Jan. . . ix, 254
Cisalpinæ Fagot. . . ix, 253
Cisalpinæ Stab. iv, 94; . ix, 303
Cisternosi Hid. iii, 259; ix, 259
Cistorum Mor. iii, 236; ix, 250
Citharistensis Bgt. . . ix, 254
Citrina Hutt. i, 126.
Citrina L. ii, 72.
Citrinoides Grat. ii, 70.
Citrinula Z. . . ix, 302
Clairi Bgt. . . ix, 331
Clairvillia Fér. ii, 35,
Clairvillia Rve. ii, 36.
Clandestina Hartm, iii, 175; [ix, 273
Clara Held. ii, 156.
Clarencensis Cox, ii, 169.
Clarki Lea, iii, 149; . ix, 77
Claromphalos Dev. & Hpe. [iv, 80; ix, 198
Clarus Aust. . . ix, 209
Clathrata West, . . ix, 319
Clathratula Pfr. iii, 161; ix, 146
Clausæ Hde. ii, 117.
Clausæ Raf. . . ix, 69
Clausæ Say, iii, 153; . ix, 77
Clausomphalos Dev. & Hpe. [iv, 78; ix, 198
Claustralis Parr. . . ix, 266
Clayi Liardet, ii, 181.
Cleamesi Smith. ii, 45.
Cleryi Recl. vii, 76; . ix, 143
Clessini Ulic. . . ix, 273
Climacterica Bens. ii, 23, 95.
Clivorum Hartm. . . ix, 252
Clossura Let. & Bgt. iii, 229.
Clotho Fér. vi, 42; . ix, 157
Clusilis Val. . . ix, 205
Clymene Shutt. ii, 172.
Clypeus Mouss. ii, 20.
Coactiliata Fér. iii, 49; . ix, 199
Coadunata Z. . . ix, 278
Coagulata Pfr, ii, 73:
Coagulum Mts. viii, 263; ix, 173
Coactata Fér. vi, 151; ix, 133
Coactata Mlldff. . . ix, 146
Coactata Pfr. iii, 71; . ix, 24
Cobresiana Alt. iii, 171; ix, 278
COCCOGLYPTA Pils. . . ix, 211
Cocomelas Sowb. vii, 146; [ix, 222
Cochinchinensis Pfr. ii, 81.

- Cochinchinensis* Morl. i, 177.
Cochlea Adans. . . ix, 326
COCHLICELLA (Fér.) Risso, [ix, 263
COCHLICOPA Fér. . ix, xviii
Cochlidium Cox, iii, 25; ix, 34
Cochlitoma Fér. . ix, xviii
Cochlodina Fér. . ix, xviii
Cochlodonta Fér. . ix, xviii
COCHLODRYAS Martens, ix, 225
Cochlogena Fér. . ix, xviii
Cochlohydra Fér. . ix, xviii
Cochloides Fér. . ix, xviii
Cochlostyla Fér. . ix, 218
Codia Bgt. iv, 16; . ix, 254
Codonensis Hid, vii, 140; ix, 222
Codonodes Pfr. vi, 236; ix, 109
Codringtoni Gray, iv, 143; [ix, 325
Cœlatura Fér. ii, 21.
Cœlaxis Pils. vii, 114; . ix, 221
Cœlomphala Loc. . ix, 273
Cœlospira Anc. . ix, 194
Cœpta Cox, iii, 263; . ix, 338
Cœrulans, Mhl. iv, iii, . ix, 301
Coerulea Mlldff. vii, 101; ix, 215
Cœsus Cox, . ix, 10
Coffea Pfr. ii, 80.
Coffreanus Moric. i, 62.
Coguiensis Cr. i, 118.
Cognata Fér. v, 59; . ix, 97
Coiquecana Ph. iii, 43; ix, 41
Colchica Bayer, . ix, 272
Colensoi Sut. viii, 99; . ix, 33
COLIOLUS Tap.-Can. . ix, 171
Collapsus Perry, . ix, 108
Collaris Pfr. iii, 138; . ix, 39
Colletti Bedd. viii, 274; ix, 124
Collingii Smith, viii, 287; ix, 114
Colliniana Bgt. . ix, 267
Collinsoni A. Ad. iii, 191.
Collis Mouss. . ix, 112
Collodes Sowb. vii, 184; ix, 224
Collyrula Rve. . ix, 13
Coloba Pils. . ix, 57
Colombeliana Hde. ii, 122.
Colomiesiana Bgt. iii, 232; [ix, 250
Colona v. Mts. vi, 190; ix, 136
Coloradoensis Stearns, viii, [225, ix, 199
Colorata Mouss. ii, 72.
Colorata Mouss. . ix, 140
Colorata Nev. . ix, 322
Collossea Pfr. . ix, 227
Colosseana Fag. . ix, 257
Coluber Beck, . ix, 112
Colubrina Jan. iv, 105; ix, 302
Colubrina Perry, . ix, 166
Columbaria Sowb. vi, 234; [ix, 109
Columbiana Lea. iii, 154; [ix, 76
Columbina West. . ix, 259
Columellaris Bk. ii, 73.
Columellaris Pfr. ii, 127.
Columellata C. B. Ad. v, 9; [ix, 67
Columnæ Pons. viii, 148; ix, 288
COLUMPLICA Hartmann, ix, 226
Coma Gray, iii, 22; . ix, 33
Comaliana Bgt. iii, 227; ix, 337
Combesiana Bgt. iii, 190; ix, 268
Combusta Anc. iii, 238.
Comendadori Serv. . ix, 251
Comephora Bgt. iv, 96; ix, 303
Comes Poey. v, 11; . ix, 187
Commeata Mouss. . ix, 250
Commendabilis Fér. ii, 70.
Commixta, Lwe. . ix, 242
Commoda A. Ad. iii, 191.
Communis Ben. . ix, 331
Communita Anc. . ix, 76
Comnena Ret. . ix, 255
Comorensis Morel. ii, 78.
Compacta Haz. iv, 237; ix, 319
Compacta Lwe. iv, 39; ix, 242
Companyoi West. . ix, 325
Companyonii Aler. iv, 148; [ix, 325
Compar Lwe. iv, 37; . ix, 243
Complanata Bgt. iv, 95; ix, 302
Complanata Desh. ii, 195.
Complanata Jeffr. ii, 138.
Complanata Mart. ii, 36.
Complementaria Mouss. iii, [40; ix, 35
Compluvialis Blauf. ii, 93.

- Compluviata Cox, ii, 44.
 Compressa Mouss. . ix, 159
 Compressivoluta Rv. i, 128 ;
 [ix, 18
 Compressus Zgl. ii, 135.
 Compsopleura Bgt. . ix, 302
 Compta H. Ad. . ix, 112
 Comriei Ang. vii, 64 ; . ix, 142
 Comta Gundl. v, 34 ; . ix, 185
Comythophora Bttg. . ix, 303
 Concava Say, ii, 206.
 Concavospira Pfr. ii, 57.
 Concentrica Guill. iii, 81 ; ix, 6
 Concholeuca L. & B. . ix, 257
Concinna A. Ad. iii, 185.
Concinna Dup. iii, 174.
Concinna Jeffr. iii, 173 ; ix, 274
Concinna Lwe. iii, 21 ; . ix, 341
Concinna Sowb. viii, 27 ; ix, 229
 Concisa Fér. vi, 262 ; . ix, 120
 Concolor Bttg. viii, 126 ; ix, 5
 Concolor Fér. ii, 208.
 Concolor Mts. ix, 267.
 Concolor Pils. vi, 303 ; ix, 154
 Concreta Bgt. . ix, 275
 Condeumoyi Nev. iii, 108.
 Condoriana C. & F. vi, 269 ;
 [ix, 124
 Conella Ad. iv, 56 ; . ix, 169
 Conella Pfr. viii, 58 ; . ix, 9
 Conemenosi Bttg. viii, 229 ;
 [ix, 303
 Conferta Pfr. iii, 81 ; . ix, 6
 Confinis Blf. ii, 53.
 Confinis Gass. iii, 35 ; . ix, 33
 Conformis Fér. vii, 113 ; ix, 221
 Confucii Hilb. viii, 213 ; ix, 206
 Confusa Ben. iv, 92 ; . ix, 302
 Confusa Pfr. i, 125.
 Congellana Kr. iii, 108.
Congener Sm. . ix, 213
 Congenita Sm. vi, 103 ; ix, 213
 Congrua Pfr. vii, 4 ; . ix, 139
Congrua Pse. not Pfr. . ix, 6
 Conica Drap. . ix, 263
 Conica Jeffr. . ix, 274
Conica Pils. vi, 305 ; . ix, 214
Conica Swains. . ix, 64
Conicava Mouss. . ix, 25
 Conicoides Metc. ii, 48.
 Conicula Let. & Bgt. . ix, 260
 Coniformis Fér. vii, 50 ; ix, 140
 Conimbricensis Silv. . ix, 274
 Conisalea M. & P. viii, 145 ;
 [ix, 38
 Conjungens Stol. ii, 110.
 Connectens C. B. Ad. iii, 6 ;
 [ix, 64
 Connectens Mlldff. . ix, 229
 Connexa West. . ix, 330
 Connivens Pfr. vi, 96 ; . ix, 213
 Conoidalis Ad. & Rve. ii, 82.
 Conoidalis Mlldff. . ix, 342
Conoidea Anc. viii, 264 ; ix, 95
Conoidea Bgt. . ix, 44
Conoidea Branc. . ix, 266
Conoidea Cox, . ix, 19
Conoidea Dh. . ix, 206
Conoidea Drap. iv, 31 ; ix, 264
Conoidea Hde. . ix, 171
Conoidea West. ix, 118 ; ix, 306
 Conoideus Pfr. i, 62.
Conomphala Pfr. . ix, 337
 Conopsis Mor. iv, 22 ; . ix, 261
 Conospira Pfr. iii, 218 ; ix, 169
Conrauxiana Hde. iii, 209 ;
 [ix, 204
Consanguinea C. B. Ad. ix, 90
Consanguinea Fér. vi, 30 ; ix, 157
 Conscondens Cox, vii, 14 ; ix, 141
 Consepta Bens. ii, 90.
 Consimilis Pse. iii, 60 ; . ix, 26
 Consobrina Fér. iv, 171 ; ix, 327
 Consobrina Grt. iii, 66 ; ix, 26
 Consona Zgl. iii, 188 ; . ix, 272
 Consors Lwe. iv, 39 ; . ix, 242
 Conspectum Bld. ii, 203 ; ix, 8
 Conspersula Pfr. v, 38 ; ix, 183
 Conspicua Ben. iv, 207 ; ix, 330
 Conspurcata Drap. iv, 12 ;
 [ix, 254
 Conspurcatella Morel. iii, 50 ;
 [ix, 57
 Constantie H. Ad. viii, 206 ;
 [ix, 206
Constantine viii, 206 ; . ix, 206

- Constantinae Fbs. iv, 129; ix, 324
 Constantior Weinl. v. 26;
 [ix, 184
 Constricta Boub. iii, 121; ix, 288
 Constricta Pfr. vii, 103; ix, 215
 Constricta Semp. iii, 67; ix, 26
 Constricta West. . . ix, 249
Constrictor Hupe, . . ix, 166
 Consul Pfr. ii, 89.
 Contaminata Paul. iv, 220;
 [ix, 332
 Contempta Parr. . . ix, 255
 Contermina Sh. iv, 31; ix, 264
 Contigua Pse. iii, 78; . ix, 6
 Continua Pfr. v, 137; . ix, 94
 Contorta Fér. iii, 63; . ix, 26
Contorta Held. ii, 142.
Contorta Muhlf. . . ix, 284
Contorta Zgl. . . ix, 288
Contortula Fér. . . ix, 41
 Contortula Kryn. ii, 141.
 Contracoste Pils. . . ix, 199
 Contracta Hutt. iv, 65; ix, 116
 Contracta West. ii, 139.
 Contristata Mouss. ii, 82.
 Conula Pse. ii, 49.
Conulema Stol. ii, 7.
 Conulina Mart. iii, 219; ix, 169
 CONULOPOLITA Bttg. ii, 181.
 Conulus Blf. ii, 58.
 CONULUS Fitz. ii, 11; 172.
Conulus H. Ad. ii, 176.
Conulus Mart. not Pse. ix, 170
 Conus Pils. vi, 79; . ix, 154
 Convallata Bens. ii, 93.
Convexa Fér. . . ix, 47
 Convexa Hartm. viii, 131;
 [ix, 5
 Convexa Mart. . . ix, 141
Convexa Raf. . . ix, 78
 Convexa Rve. ii, 108.
 Convexiuscula Pfr. ii, 214.
 Convicta Cox, vi, 187; ix, 136
 Convoluta Desh. ii, 88.
 Cookensis Braz. vi, 175; ix, 134
 Cookiana Gmel. iii, 6; . ix, 64
Cookiana Pfr. . . ix, 64
 Cooperi W. G. B. viii, 118;
 [ix, 50
Copei Weth. iii, 144; . ix, 76
 Coppingeri Sm. iii, 42; ix, 41
 Coquandiana Math. . ix, 333
 Coquandi Mor. iv, 125; ix, 322
 Coracis Kob. . . ix, 326
Coralliolabris Smith, . ix, 142
 Corallina Mouss. iii, 93; ix, 6
 CORASIA Albers, . . ix, 219
 Corax Parr. ii, 136.
 Corcyrensis Bttg. ii, 134.
 Corcyrensis Partsch. iii, 117;
 [ix, 288
 Cordelia Hutt. viii, 66; ix, 14
 Cordemoyi Nev. ii, 107.
 Cordovana Pfr. iii, 49; ix, 199
 Corduensis Noul. ix, 294.
 Coreanica A. & R. iii, 220;
 [ix, 204
Coriacea Sandb. . . ix, 295
Coriaria Pfr. vi, 132; . ix, 131
 CORILLA H. & A. Adams,
 [ix, 147
Corisopitensis Dh. . ix, 308.
 Cornaria Berth. iii, 239.
Cornea Brum. . . ix, 303
 Cornea Drap. iv, 110; . ix, 301
Cornea Hartm. . . ix, 267
 Cornea Hedl. viii, 296; . ix, 5
 Cornea Hutt. viii, 75; . ix, 18
 Corneofulva Pfr. viii, 76; ix, 18
 Corneola Cless. . . ix, 274
Corneola Hedl. . . ix, 299
 Corneoliformis Less. . ix, 307
 Corneovirens Pfr. vi, 136;
 [ix, 130
 Corniculum H. & J. vi, 291;
 [ix, 113
 Corniculum Rv. iii, 24; ix, 33
 Cornugiganteum Chemn. vi,
 [60; ix, 152
Cornumilitare auct. . ix, 100
Coronadoi Hld. vii, 142; ix, 222
Coronaria Lowe. . ix, 244
 Coronata Desh. iv, 34; . ix, 244
 Coronula Lwe. iv, 34; . ix, 245

- Corrota Mouss. ii, 35, 43.
 Corrugata Gmel. iii, 252; ix, 259
Corrugata Gray, . ix, 273
Corrugata Pfr. . ix, 184
Corrugata Sol. . ix, 293
 Corrugata Z. . ix, 331
 Corsica Sh. iii, 180; ix, 273
 Corticaria Ph. iii, 43; ix, 41
 Corticicola Cox, iii, 44; ix, 34
 CORYDA Albers, . ix, 181
 Corylus Reeve, ii, 95.
 Corymbus Cr. i, 117; ix, 20
 Corys Bens. iii, 95.
 Cosmia Pfr. iii, 106; viii, 135.
Cossmanniana Cr. . ix, 230
 Cossoni Let. iv, 148; ix, 322
 Cossurensis Ben. iv, 207; ix, 330
Coste Ben. . ix, 318
 Costaricensis Roth, v, 134; [ix, 191
 Costata Müll. viii, 252; ix, 283
 Costata Semp. vi, 219; ix, 108
 Costella Orb. iii, 41; ix, 41
 Costellifera Möll. viii, 125; [ix, 4
Costerii Eyd. . ix, 230
 Costulata Ben. iv, 205; ix, 331
 Costulata G.-Aust. ii, 62.
 Costulata Hutt. viii, 73; ix, 18
 Costulata Kob. . ix, 307
 Costulata Marts. . ix, 5
Costulata Mich. . ix, 281
 Costulata Mlldff. iii, 266; ix, 47
 Costulifera Pfr. i, 120. ix, 33
Costulosa Zgl. . ix, 255
 Costulosus Pfr. i, 63.
 Cotinophila Bgt. . ix, 275
 Cottiana Poll. iii, 185.
 Cotty Mor. iii, 236; ix, 250
 Cotyledonis Bens. iii, 103; [viii, 135
Couchiana Lea. . ix, 74
 Couloni Shuttl. iii, 134; ix, 74
 Courquini Bgt. ii, 153.
 Cousini Jouss. v, 183; ix, 167
 Coutagnei Bgt. . ix, 256
 Couturierii Bgt. iii, 229.
 Covani E. A. Smith, vi, 44; [ix, 157
 Coxenæ Braz. vi, 138; ix, 122
 Coxeni Cox, viii, 272; ix, 122
 Coxiana Ang. vii, 13; ix, 140
 Coxi, Crosse, vi, 152; ix, 133
 COXIA Ancey, . ix, 82
Cracherodii Gray, ii, 76.
 Cragini Call. iii, 144; ix, 76
Craspedaria Lowe. . ix, 244
 Craspedocheila Ad. iii, 191.
 Crassa Mlldff. vii, 125; ix, 220
 Crassa Pfr. iv, 144; ix, 326
 Crassicosata Bens. iv, 64; [ix, 116
 Crassidens Deb. iv, 137; ix, 324
Crassidens Pfr. . ix, 91
 Crassilabris Mlldff. . ix, 220
 Crassilabris Mühlf. . ix, 278
 Crassilabris Nev. . ix, 275
Crassilabris Pfr. . ix, 98
 Crassior Nev. . ix, 322
 Crassocarina Mouss. . ix, 234
 Crassula Mlldff. . ix, 337
 Crassula Phil. viii, 271; ix, 124
Cratera Schum. . ix, 261
 Craticulata Lwe. iv, 191; ix, 293
 Craverii Poll. ii, 220.
 Crawfordi M. & P. viii, 146; [ix, 38
 Crebriflammis Pfr. i, 130; ix, 18
 Crebriguttata Mart. ii, 69.
Crebristriata Newc. . ix, 200
 Crebristriata Semp. ii, 104.
 Creedi Cox, vi, 170; ix, 134
 Crema Bgt. . ix, 257
 Cremata Hde. iii, 207; ix, [204, 214
Crennophila Boiss. . ix, 248
Creneu Alb. . ix, 261
Crenella Mont. . ix, 283
 Crenicincta G.-Aust. ii, 60.
 Crenimargo Kryn. iii, 252; [ix, 259
 Crenophila Pfr. iii, 174.
 Crenularis Beck, i, 174.
 Crenulata Müll. . ix, 263

- Crespignyi* Higg. ii, 76.
Cressa West. . . ix, 276
Cressida Gld. iii, 91; . ix, 6
Cretacea Born. ii, 71.
Cretacea Grt. iii, 66; . ix, 25
Cretacea Westerl. . ix, 318
Cretata Brod. vii, 168; ix, 224
Cretensis Blanc. ii, 192.
Cretica Fér. iii, 239; . ix, 250
Creticola Mörch. . ix, 307
CRETOZONITES Kob. viii, 236.
Creveauxiana Anc. viii, 264; [ix, 95
Cribrata West. . . ix, 266
Crimoda Bgt. . . ix, 275
Crinigera Bens. iii, 94; ix, 208
Crinita Sandri, iv, 100; ix, 302
Crisia Let. & Bgt. . ix, 257
Crispata Ben. iv, 206; . ix, 331
Crispata Costa, . . ix, 318
Crispata Fér. v, 72; . ix, 99
Crispolanata Woll. iii, 123; [ix, 289
Crispulata Mouss. . . ix, 273
Cristatella Mlldff. . ix, 215
Critica Fér. . . ix, 250
CRISTIGIBBA Tap. Can. ix, 112
Croatia Fér. ii, 137.
Croaticus Partsch, ii, 136.
Croftoni Cox, vi, 153; . ix, 133
Crombezi Mill. iv, 111; ix, 301
Cromyodes Pfr. vii, 130; ix, 222
Cronkheti Newc. iii, 21; ix, 48
Crossei Hid. vii, 156; . ix, 223
Crossei Hid. viii, 134; . ix, 4
Crossei Pfr. i, 67.
Crossei Pfr. ii, 43.
Crotali Cox, ii, 212.
Crouanii Guill. iii, 90; . ix, 5
Crouzilliana Fag. . . ix, 256
Crucibulum Pfr. vii, 81; ix, 143
Cruentata Guild. ii, 183.
Crusta Dall, . . ix, 185
Crustulum Cox, iii, 90; ix, 5
Cruzyi Bgt. iii, 198; . ix, 272
Cryophilum Mts. iii, 32; ix, 8
Crypsidoma Mab. iv, 165; ix, 327
Crypta Parr. ii, 135.
Cryptaxis Lowe. . ix, 291
Cryptica Brod. vii, 167; ix, 224
Cryptobidens Sut. viii, 85; [ix, 27
Cryptodon Moric. i, 66.
CRYPTOMPHALUS Agas. ix, 318
Cryptomphalus Nev. ii, 126.
Cryptopila Marts. iii, 211; [ix, 124
Cryptoportica Gld. ii, 116.
Cryptozona Zgl. . . ix, 302
Crystallina Dillw. . ix, 283
Crystallina Müll. ii, 138.
CRYSTALLOPSIS Ancey, ix, 220
Crystallus Lwe. ii, 10.
Cubensis Pfr. v, 10; . ix, 187
Cucullus Mts. iv, 28; . ix, 263
Cularensis Bgt. . . ix, 275
Culmen Blf. ii, 53.
Culmi Fag. . . ix, 256
Culminicola Pons. viii, 234; [ix, 330
Cultellatus Thom. ii, 135.
Cultrata Gld. ii, 125.
Cuma Chier. ii, 144.
Cumberlandiana Lea, iii, 58; [ix, 50
Cumia Calc. . . ix, 262
Cumingi Pfr. viii, 39; ix, 230
Cumingi Pfr. . . ix, 224
Cumingii Beck, i, 172.
Cumulus Pfr. ii, 105.
Cunctator Rv. vii, 202; ix, 227
Cuneus Hde. ii, 219.
Cunninghami Gray, vi, 14; [ix, 159
Cupaniana Calc. . . ix, 47
Cupani Calc. . . ix, 254
Cuprea Cox, iii, 24; . ix, 340
Cuprea Raf. ii, 185.
Cupulata Pfr. . . ix, 93
Curacœ Brazier, . ix, 34
Curetum West. . . ix, 256
Curta Sowb. vii, 192 . ix, 225
Curtisiana Pfr. vi, 168; ix, 134
Curvidens Pfr. . . ix, 97
Curvilabrum Rve. iii, 86; [ix, 4

- Cuspidata Lewis, ii, 200.
 Cussetiensis Bgt. . ix, 267
 Cuticula Sh. iv, 201; . ix, 294
 Cutisculpta Mldff. iii, 158; [ix, 146
 Cuttati Bgt. iii, 229.
 Cutteri H. Ad. ii, 88.
 Cutteri Pfr. viii, 93; . ix, 28
 Cuvieriana Lea ii, 38.
 Cuvieri Fér. i, 168.
 Cuyamacensis Hemph. . ix, 199
 Cuyana Strob. iv, 78; . ix, 198
 Cuyoensis Pfr. viii, 47; . ix, 231
 Cuyoensis Rve. . ix, 231
 Cuzcana Phil. i, 64.
 Cyanocephala Pils. . ix, 228
 Cyanostoma Mab. vi, 48; ix, 157
 Cyclaria Morel. iii, 108; viii, 135
 Cyclaspis Bens. iii, 164; ix, 145
 Cyclodoma Swains. . ix, 69
 Cyclodon W. & B. iv, 26; [ix, 261
 Cycloidea Alb. ii, 90.
 Cyclolabris Desh. iv, 114; [ix, 303
 Cyclophorella Anc. viii, [259; ix, 284
 Cycloplax Bens. ii, 129.
 Cyclostoma Mke. . ix, 243
 Cyclostoma West. . ix, 251
 Cyclostomata LeGuill. iv, 65; ix, 114
 Cyclostomoides Pfr. iii, 100; [ix, 58
 Cyclostomoides Porro, . ix, 249
 Cyclostomopsis Lea, . ix, 122
 Cyclostremoides Sby. iv, [256; ix, 261
 Cyclothyra Bttg. . ix, 304
 Cyclotrema Ben. ii, 17.
 Cygnea Benson, ii, 213; ix, 34
 Cyix Bens. ii, 84.
 Cymatium Bens. ii, 42.
 Cymatodes Pfr. v, 146; ix, 94
 Cymbalum Morel. ii, 187.
 Cymodoce Cr. vii, 107; ix, 220
 Cymotropis Mart. . ix, 137
 Cynetarium Malz. . ix, 273
 Cyparissias Parr. iv, 11; ix, 254
 Cypreophila Newc. iv, 75; [ix, 199
 Cypria Kob. . ix, 320
 Cypria Pfr. ii, 194.
 Cypsele Pfr. i, 63.
 Cyrena=cyrene.
 Cyrenaica Mts. iii, 234; ix, 250
 Cyrene Crosse, vii, 78; ix, 143
 Cyrniaca Dut. iv, 112; ix, 305
 CYRTOCHILUS Sandb. . ix, 311
 Cyrtolena Bgt. . ix, 319
 Cyrtopleura Pfr. iv, 65; ix, 114
 Cysis Bens. ii, 15.
 Cysticopsis of authors, . ix, 65
 CYSTICOPSIS Mörch. . ix, 186
 Cyzicensis Gall. . ix, 256
 Dacampi Villa. . ix, 265
 Dactylus Brod. . ix, 228
 Dædalea Gld. iii, 64; . ix, 27
 Dædalocheila Beck, . ix, 68
 Daemeli v. Mts. vi, 184; ix, 135
 Daghestana Bttg. ii, 220.
 Daghestana Parr. iv, 86; ix, 304
 Daghoba Blanf. iii, 69.
 Daimio Ad. . ix, 214
 Daintreei Braz. vi, 134; ix, 130
 Dalbertisi Brazier, viii, 295; [ix, 31
 Dalingensis Aust. ii, 102.
 Dalmatica Dh. . ix, 300
 Dalmatica Mühlf. . ix, 319
 Dalmatina Cl. . ix, 44
 Dalmatina Parr. . ix, 300
 Damahoyi Pfr. vii, 143; ix, 223
 Damarensis H. Ad. iii, 138; [ix, 39
 Damascenus Gld. . ix, 200
 Damnata Brong. . ix, 295
 Dampieri Ang. vii, 11; ix, 140
 Danæ Pfr. ii, 45.
 Dandenongensis Pett. . ix, 34
 Danieli Bgt. iii, 230; . ix, 250
 Dantei Bgt. . ix, 251
 Danubialis Cless. . ix, 274
 Daphnica Plat. . ix, 272
 Daphnis Brod. vii, 201; ix, 227

- | | |
|---|---|
| Darjilingensis Aust. ii, 99. | Decussata Boettger, . ix, 322 |
| <i>Darnaudi</i> Jick. . ix, 268 | <i>Decussata</i> Parr. . ix, 319 |
| Darnaudi Pfr. iii, 104; ix, 268 | Decussatula Pse. iii, 60; ix, 27 |
| Darnleyensis Braz. ii, 181. | Deferiana Bgt. iv, 17; ix, 256 |
| Darolli (Let.) Bgt. . ix, 261 | <i>Deflexa</i> Pfr. . ix, 181 |
| Darondeauui Soul. ii, 40. | <i>Defourii</i> Grat. ii, 70. |
| Darwini Braz. vi, 128; ix, 132 | Degagei Grt. iii, 65; . ix, 27 |
| Dasilepida Bgt. . ix, 272 | Degenerans Mouss. iv, 22; [ix, 26] |
| <i>Dastagui</i> =Dastugui. | <i>Deidamia</i> Aug. . ix, 140 |
| Dastugui Bgt. iv, 142; ix, 325 | Deila Bgt. ii, 151. |
| Dataensis Semp. vii, 169; ix, 224 | Deiopeia Ang. iii, 89; . ix, 5 |
| Dautezi Kob. ii, 158. | Dejeana Hde. viii, 215; ix, 207 |
| Dautezi Kob. iii, 248; . ix, 250 | <i>Dejecta</i> Gld. . ix, 77 |
| <i>Daveyensis</i> Cox, iii, 265; ix, 34 | Dejecta Z. Rm. iii, 246; ix, 252 |
| Davidiana Bgt. iii, 24; ix, 250 | Dehiscens Westerl. . ix, 320 |
| Davidi Dh. ii, 103; . ix, 205 | Dehnei Rm. iii, 225; . ix, 337 |
| Dealbata Brod. vii, 119; ix, 219 | Delabris Mouss. iv, 86; ix, 304 |
| Dealbata Lwe. iv, 38; ix, 243 | Delacourti Mab. Bgt. ix, 266 |
| Deaniana Ford, vi, 292; ix, 113 | Delacuri Mab. . ix, 266 |
| Deana Tassy. . ix, 256 | Delaminata Ad. . ix, 64 |
| Debeauxiana Bgt. iii, 28; [ix, 44] | Delavayana Hde. ii, 217. |
| Debeauxi Kob. viii, 55; ix, 234 | Delavayana Hde. . ix, 214 |
| Debeauxi West. . ix, 257 | <i>Delectabilis</i> Sol. . ix, 281 |
| Debettai Ad. iv, 94; . ix, 303 | Delessertiana LeGuill iv, 66; [ix, 114] |
| Debettana Ad. ii, 158. | Delibrata Bens, iv, 64; ix, 116 |
| Debilis Pfr. iii, 101; . ix, 58 | Deliciosa Pfr. vi, 113; ix, 124 |
| Debilis West. . ix, 309 | <i>Delitescens</i> Shutt. . ix, 73 |
| Decagyra Phil. iii, 125; ix, 83 | Delomphala Anc. . ix, 271 |
| Decomplicata Mouss. iii, 63; [ix, 26] | <i>Delomphalus</i> Ag. . ix, 45 |
| Decidua Pfr. viii, 71; . ix, 16 | Delopida Jan. . ix, 273 |
| Decipiens Bttg. ii, 220. | Delphax Dohrn, viii, 271; [ix, 120] |
| Decipiens Sowb. vii, 140; [ix, 222] | Delphinula Lwe. iv, 44; ix, 245 |
| Declivis Pfr. ii, 46. | Delphinuloides Lwe. iv, 34; [ix, 245] |
| Declivis Sandb. . ix, 295 | Delpretiana Paul. iv, 243; [ix, 319] |
| Declivis Sterki, viii, 251; ix, 283 | Delta Pfr. ii, 215; . ix, 19 |
| Decolorata Drouet, ii, 166. | Deltoidea Simp. viii, 152; ix, 73 |
| <i>Decolorata</i> Lwe. . ix, 293 | Demani Tap.-Can. iii, 26; [ix, 35] |
| Decolorata Pils. vi, 91; ix, 129 | Demissa Ben. iv, 204; ix, 330 |
| Decora A. & R. vii, 133; [ix, 222] | Demissa Binn. ii, 197. |
| Decorata Fér. . ix, 228 | Demolita Hde. . ix, 209 |
| <i>Decorata</i> Pfr. iii, 225; ix, 336 | Denansi Kob. iv, 135; ix, 324 |
| Decorticata Grt. iii, 40; ix, 35 | Denatale Ben. ii, 157. |
| Decreta Gass. iii, 26; . ix, 33 | |
| Decussata Bens. ii, 90. | |

- Detrita Hartm. . . ix, 275
 Deusta Lwe. . . ix, 258
 Devauxi Deb. iii, 240; ix, 249
 Devia Gld. iii, 154; . ix, 76
 Devia Mouss. iv, 20; . ix, 258
 Devians West. . . ix, 252
Devincta Tap.-Can. . ix, 109
 Dexia Bgt. . . ix, 250
 Dextrorsa G.-Aust. iii, 164; [ix, 145
 D'hericourtiana B. iii, 104; [ix, 268
 Diabloensis Coop. iv, 74; ix, 199
 Diæga Bgt. . . ix, 275
Diaglyptus Pils. . . ix, 22
 DIALEUCA Albers, . ix, 182
 Diana Brod. viii, 14; . ix, 228
Diaphana Charp. ii, 138.
Diaphana Kryn. ii, 147.
Diaphana Lam. v, 22; ix, 186
Diaphana Lea, ii, 84.
Diaphana Studer. ii, 141.
Diaphanella Kryn. ii, 147.
 Diarbekirana Gall. . ix, 333
Dibothrion Friv. . . ix, 279
 DIBOTHRION Pfr. . . ix, 278
 Dicallistodon Bgt. . ix, 325
 Dichroa Pfr. iii, 208; . ix, 204
 Dichromolena Bgt. . ix, 319
 Dichrozona Mart. . ix, 304
 Dietæa Mart. viii, 191; ix, 277
 Dietyodes Pfr. iii, 95; ix, 53
 Dietyonina Euth. viii, 134; [ix, 53
 Didiera Bgt. . . ix, 251
 Didrichsenii Mörch. ii, 126.
Didyma Mhl. . . ix, 302
 Didyma West. . . ix, 249
 Dieckmanni Mss. iii, 179; [ix, 273
 Diemenensis Cox, iii, 24; ix, 34
 Diensis Malz., viii, 162; ix, 255
 Dierama Pfr. ii, 181.
 DIERAMA Pfr. ii, 11, 181.
 Diespiter Dall, . . ix, 185
 Difficilis Pfr. vii, 151; ix, 223
 DIGLYPTUS Pilsbry, . ix, 22
 Digna Mouss. iv, 186; . ix, 328
 Digonophora Anc. . ix, 36
 Dikrangensis G.-A. ii, 66.
 Dilatata Ben. . . ix, 262
 Dilatata Pfr. v, 73; . ix, 99
 Dilatata Pfr. vii, 193; . ix, 225
 Dilatata West. . . ix, 266
Dilwyniana Pfr. . ix, 335
 Diloricata Bgt. . . ix, 257
 Diluta Pfr. iv, 80; . ix, 198
 Dimera Jonas, vii, 156; ix, 223
 Dimidiata Hde. . . ix, 211
 Dimidiata Mlldff. . ix, 170
 Dimidiatus Pfr. i, 253.
 Diminuta C. B. Ad. iii, 99; [ix, 58
 Dimorpha Pfr. ii, 211; ix, 15
Dinara Stentz. ii, 134.
Dinarica Bgt. . . ix, 300
 Diniensis Ramb. . . ix, 254
 Dinodeomorpha Tap.-Can. [vi, 254; ix, 120
 Diodon Parr. iii, 171; ix, 279
 Diodonta Mühlf. iii, 116; ix, 287
 Diodonta Say, . . ix, 76
 Diodontostoma Bgt. . ix, 287
 Diomedes Braz. vii, 54; ix, 142
Dionacea Dh. . . ix, 224
 Dioscoricola C. B. Ad. ii, 174; ix, 37, 58
 Diplodon Beus. iii, 69.
 Diplogonia Dohrn. v, 190; [ix, 166
 Diplomphala Möll. iii, 124; [ix, 287
 DIPLOMPHALUS C. & F. i, 113
 Diptychia Mlldff. iii, 158; [ix, 146
 Dirphica Blanc. iii, 192; ix, 272
 Discina Lwe. iv, 45; . ix, 243
 Discobolus Sh. iii, 123; ix, 289
 DISCOCONULUS Kob. ii, 172.
 Discodoma Swains, . ix, 92
 Discoidalis Stol. ii, 109.
 Discoidea Ad. ii, 201.
 Discoides Less. iii, 58.
 Discolor Fér. v, 60; . ix, 97
 Discordialis Fér. vi, 252; ix, 120

- Discordice Grt. ii, 122.
 Discrepans Pfr. iii, 9; viii, 55.
 Discrepans Pfr. . . ix, 65
 Discrepans Pils. viii, 177; ix, 248
 Discrepans Tib. . . ix, 252
 DISCULA Lowe, . . ix, 242
 DISCULELLA Pils. . . ix, 243
 Disculus Dh. v, 15; . ix, 186
Discus Albers, . . ix, 1
Discus Dh. vi, 230; . ix, 109
Discus Fitz. . . ix, 45
 Discus Mldff. ii, 104.
 Discus Pfr. i, 66.
 Discus Pfr. ii, 114.
 Dismathia Nev. . . ix, 250
 Dispar Braz. iii, 59; . ix, 27
 Dispersa Gass. iii, 45; . ix, 33
 Dissecta v. Mart. viii, 151; [ix, 74
Dissidens Desh. ii, 206,
 Dissimilis Orb. iii, 48; . ix, 41
 Dissimilis Semp. viii, 220; [ix, 204
 Dissita Dh. v, 71; . ix, 99
 Distans Bl. & W. iv, 93; ix, 303
 Distans Pse. iii, 60; . ix, 27
 Distensa Mouss. iv, 175; ix, 327
 Distincta Pfr. ii, 30.
 Distorta Hde. ii, 217.
 Distypa West. . . ix, 267
 Diurna Bgt. iii, 193; . ix, 266
 Divaricata Kobelt, . ix, 344
 Divesta Gld. iii, 152; . ix, 77
 Divisa Fbs. ii, 39.
 Djamnensis Kob. . . ix, 343
 Djarica Bgt. . . ix, 261
 Djebbarica Bgt. iii, 236; ix, 249
Djerbanica L. & B. . ix, 336
Djulfensis Mouss. . . ix, 333
 Djurjurenensis Deb. ii, 195.
 Dobrudschæ Parr. . ix, 252
 Dobruschæ Cless. . . ix, 301
 Doderleiniana All. . ix, 315
 Doenitzii Reinh. ii, 171.
 Dohniana Pfr. ii, 83.
 Dohni Paul. viii, 173; ix, 255
Dohni Strebel, ii, 185.
Dolata Fér. . . ix, 91
 Dolium Gredl. . . ix, 171
Dolium Hartm. . . ix, 226
 Dolomitica Deb. . . ix, 251
 Dominicensis Pfr. v, 70; ix, 99
 Dominula Tap.-Can. vi, 293; [ix, 113
 Donnaisabellæ Ang. vii, 71; [ix, 143
Donatii Berth. . . ix, 336
 Donata Hagenm. . . ix, 305
 Donovani Pfr. ii, 40.
 Dorani Aust. ii, 99.
Dorcasia Auct. . . ix, 200
Dorcasia Binn. . . ix, 67
 DORCASIA Gray, . . ix, 172
 Dorfeuilliana Lea, iii, 133; [ix, 73
Dorfeuilliana Pfr. . ix, 74
 Dorgaliensis Mts. . . ix, 330
Doriæ Dohrn, . . ix, 104
Doriæ Paul. iv, 117; . ix, 307
Doriæ Tap.-Can. ii, 218.
 Dormiens Ben. iii, 252; ix, 259
 Dormitans Hde. iii, 222; ix, 170
 Dorri Wattebl. ii, 220.
 Doubletti Bgt. . . ix, 325
 Doumeti Bgt. . . ix, 259
 Downieana Bld. iii, 153; ix, 77
 Dragorichi Zel. iii, 249; ix, 249
Draparnaldi Beck, ii, 149.
Draparnaudia M.-T. . ix, 307
 Dravica Serv. . . ix, 307
 Draxeleri Zel. . . ix, 266
 Drepanensis Huet. iv, 204; [ix, 330
Drepanostoma Bk. . ix, 287
 DREPANOSTOMA Porro, ix, 287
 Dringi Pfr. vi, 186; . ix, 136
 Drouetiana Morel. iv, 197; [ix, 293
 Druentina Bgt. . . ix, 275
 Dryanderensis Cox, iv, 66. [ix, 114
 Dryas Brod. viii, 49; . ix, 231
 Dryope Brod. vii, 100; ix, 215
Dschulfensis Dub. . ix, 333
 Dschulfensis Bgt. iv, 228; ix, 333
Dubia Ben. ii, 189.

- Dubia* Cless. . . ix, 274
Dubia Hartm. . . ix, 252
Dubia Taylor, ii, 51.
Dubiosa Pfr. vii, 135; . ix, 222
Dubisiana Cout. . ix, 274
Dubois Charp. ii, 192.
Dubreili Serv. . ix, 267
Dubreili Cless. ii, 139.
Ducalis Anc. vi, 199; . ix, 103
Ducani Cox, iii, 261, 46; ix, 13
Duclosiana Fér. v, 19; ix, 186
Ductilis Pfr. ii, 169.
Duesmensis Loc. . ix, 275
Dufresnii Leach, . ix, 163
Dumeticola Bens. iii, 106; viii, 135.
Dumivaga Morel. iv, 17; ix, 257
Dumontiana Bgt. ii, 154.
Dumonti Pfr. viii, 42; . ix, 230
Dumonti Mort. . ix, 304
Dumorum Bgt. . ix, 204
Dunkeri Pfr. v, 174; . ix, 95
Dunkiensis Forbes, iii, 215; [ix, 130
Dunniæ Gray, i, 126.
Dupetithouarsi Dh. iv, 71; [ix, 199
Duplocincta Mart. viii, 216; [ix, 204
Duplicata Lwe. . ix, 242
Duplicata Mouss. iv, 31; ix, 264
Duponti Morel. ii, 21.
Dupotetiana Terv. iv, 138; [ix, 325
Duralensis Cox, vi, 141; ix, 130
Durandoiana Bgt. ii, 154.
Duranti Newc. ii, 208.
Dura Pfr. ii, 45.
DURGELLA Blf. ii, 8, 111.
Durieuri Moq. iii, 236; ix, 249
Duriezi Deb. . ix, 307
Duroi Hid. iv, 128; . ix, 335
Dussertiana Bgt. iii, 177; ix, 273
Dutailliana Mab. ii, 158.
Duvallii Petit. vi, 41; . ix, 157
Duvevrièriana Bgt. . ix, 256
Dvitija Semp. ii, 29.
Dyeri Petterd, ii, 169.
Dyrrachiensis Bgt. iv, 30; ix, 263
Dysmica West. . ix, 252
Dysoni Shuttl. iii, 132; ix, 74
Eas Dohrn, ii, 218.
Eastbournensis B. & P. ix, 34
Eastlakeana Mlldff. ii, 104.
Eastlakeana Möll. vi, 12; ix, 290
Eburnea Hartm. ii, 138.
Eburnea Rve. viii, 20; . ix, 228
Ebusitana Hid. . ix, 325
Ecarinata Mlldff. . ix, 224
Echinoderma Woll. iv, 34; [ix, 242
Echinophora Fér. vi, 71; [ix, 153
Echinulata Lwe. iv, 33; ix, 242
Eddystonensis Rve. vii, 64; [ix, 142
Edentata Mart. . ix, 111
Edentata Samp. viii, 154; [ix, 76
Edentata West. . ix, 287
Edentilabris Pils. . ix, 76
Edentula Drap. iii, 171; ix, 278
Edentula W. G. B. . ix, 76
Edetanorum Serv. . ix, 257
Edgariana Lea, iii, 141; ix, 78
Edgarianus Bens. i, 179.
Editha A. Ad. viii, 204; ix, 170
Edroea Bgt. . ix, 320
Edwardsi Bld. iii, 141; ix, 78
Edwardsi Cox, . ix, 135
Efasciata West. . ix, 307
Efferata Mouss. iv, 145; ix, 325
Effulgens Blanf. ii, 97.
Effusa Pfr. viii, 31; . ix, 229
Effusa Pfr. ii, 163.
Egbertinæ Mart. ii, 46.
Egena Gld. ii 174.
Egena Say, ii, 173.
Egenula Morel. ii, 127.
Egesta Gray, iii, 23; . ix, 33
Egregia Dh. vi, 210; . ix, 104
Ehingensis Klein, . ix, 310
Ehrenbergi Roth. . ix, 335
Eichwaldi Pfr. iv, 86; . ix, 304
Ekongensis Ang. ii, 34.

- Elachia* Bgt. iii, 28; . ix, 44
Elachystoma Mart. . ix, 343
Elaps Dohrn, v, 196; . ix, 167
Elata Borch. ii, 149.
Elata F.-B. iv, 29; . ix, 262
Elatior Ad. iii, 46.
Elatior Mts. iii, 210; . ix, 204
Elatior Weinl. & Mts. iii, 97; [ix, 58
Elaverana Bgt. . ix, 275
Elderi Bedn. viii, 278; ix, 131
Electra Semp. iii, 86; . ix, 6
Electrica Rve. viii, 53; ix, 231
Electrina Gld. ii, 153.
Electrina Jacq. ii, 112.
Elegans Bttg. ii, 192.
Elegans Flem. . ix, 254
Elegans Gmel. . ix, 262
Elegans Semp. viii, 21; ix, 228
Elegans Strebel, ii, 183.
Elegantissima Pfr. iv 52; ix, 209
Elegantula Jan. . ix, 243
Elegantula Pfr. ii, 204.
Elevata d'Orb. ii, 175.
Elevata Mlldff. vi. 230; ix, 109
Elevata Say, iii, 148; . ix, 77
Elevatoconica C. & F. ix, 190
Elia Bttg. . ix, 288
Eliaca Kob. . ix, 303
Elimberrisiana Loc. . ix, 256
Elise Anc. viii, 95; . ix, 27
Elisma Leach, . ix, 263
Elisus Hedl. viii, 292; ix, 141
Elithia L. & B. . ix, 250
Elizabethæ Semp. vii, 117; [ix, 219
Elleryi Braz. ii, 179.
Ellioti Kob. . ix, 322
Elliotti Redf. ii, 161.
Ellipsostoma Pfr. v, 173; ix, 95
Ellipsostoma Pilsbry, . ix, 199
ELONA H. & A. Adams, ix, 307
Elongata Bgt. iv, 240; ix, 319
Elongata G.-Aust. ii, 63.
Elongata Hedl. viii, 294; ix, 164
Elongata Mlldff. . ix, 231
Ema Bgt. . ix, 325

- Episema* (B.) Serv. . ix, 266
Epistilia Swains. . ix, 58
Epistyla Swains. . ix, 58
Epistylioides Fér. iii, 6; ix, 64
Epistyliulum Ad. ii, 174; [ix, 65
Epistylum Dillw. . ix, 64
Epistylum Pfr. . ix, 64
Epixantha Pfr. . ix, 205
Epsilon Pfr. . ix, 33
Equestrata Moric. v, 151; [ix, 94
Equitum Bgt. . ix, 320
Erateina M. & P. viii, 137; [ix, 38
Ereica Ben. ii, 151.
ERCTELLA Monts. . ix, 318
Erdeli Roth. iii, 30; . ix, 47
Erdmanni Schm. & Bttg. ix, 290
Erecta Hartm. . ix, 274
Erecta Mouss. v, 162; . ix, 95
Erema Bgt. iv, 18.
Eremia Auct. . ix, 334
EREMINA Pfeiffer, . ix, 334
Eremita Sut. viii, 103; . ix, 33
Eremophila Boiss. iii, 242; [ix, 248
Eremophila Kob. . ix, 334
Erepta Alb. ii, 5.
Ereta Paul. iv, 92; . ix, 302
Ergileusis Gall. . ix, 333
Erica DaC. . ix, 252
Ericetella Jouss. iii, 243; ix, 252
Ericetorum Müll. iii, 245; [ix, 252
Erigone Alb. . ix, 117
Erigone Gray, iii, 37; . ix, 9
Erinaceus Pfr. vi, 251; . ix, 120
Erinna Möreh. . ix, 334
Erithrocheila Sul. viii, 189; [ix, 250
Erjaveci Brus. ii, 142.
Erjaveci Brus. . ix, 273
Erjaveci Cless. iii, 172; ix, 278
Erjaveci Cless. . ix, 301
Erjaveci Kobelt, . ix, 322
Erkellii Kob. iii, 243; . ix, 248
Eros Angas, vii, 70; . ix, 143
Errans Ad. iii, 98; . ix, 58
Errata Aust. ii, 100.
Erratica Heude. ii, 28.
Erronea Alb. iii, 157; . ix, 148
Erubescens Lwe. iv, 191; ix, 293
Erubescens Semp. vii, 170; [ix, 221
Erycina Jan. . ix, 330
Erymanthia Kob. . ix, 303
Erythraea West. . ix, 251
Erythromorpha Mab. vi, 51; [ix, 157
Erythronixia Bgt. . ix, 337
Erythrospira Mlldff. vii, 137, [ix, 222
Erythrostoma Ph. . ix, 337
Esau Gredl. viii, 158; . ix, 209
Escheriana Mss. iv, 230; ix, 333
Esnorca Let. . ix, 251
Espiloca (Rav.) Bld. iii, 136; [ix, 73
Esserana Bgt. . ix, 257
Estella Orb. iv, 78; . ix, 198
Eta Pfr. . ix, 33
Etæma Let. & Bgt. . ix, 251
Ethelema Mab. iv, 163; ix, 327
Etheridgei Braz. vi, 156; ix, 133
Etrusca Iss. . ix, 285
Etrusca Kob. . ix, 301
Etrusca Paul. ii, 139.
Euacanthinula West. . ix, 280
EUADENIA . ix, 175
Euages Bttg. iii, 201; . ix, 272
Euboea Parr. . ix, 303
Eubœica Kob. ii, 134.
Euboeica Kob. . ix, 272
Eucalia Hagenm. . ix, 257
Eucalypta Mab. iv, 154; ix, 327
Eucampylaea West. . ix, 299
Eucana Hagenm. . ix, 251
Eucesta Bgt. . ix, 251
Eucestella Bgt. . ix, 251
Eucharis Dh. ii, 130.
Euchroes Pfr. vii, 23; . ix, 141
Euchromia Bgt. . ix, 325
Eucincta Bgt. . ix, 325
Euclasta Martens, . ix, 54
Euclasta Shutt. iii, 97; ix, 58

- Euclastolena* Mab. . ix, 275
Eucochlias Theob. . ix, 101
Euconulus Kob. ii, 172.
Eucorea Bgt. . ix, 257
Eucyæ Serv. iii, 204.=encyæ.
Eudædalæa Bgt. ii, 143.
Eudeli Dh. ii, 25.
Eudora Ang. iii, 88; . ix, 5
EUDOXUS Alb. . ix, 229
Euetha Bgt. . ix, 251
Eufidana=enfidana . ix, 260
Euganea Stab. iv, 91; . ix, 301
Eugastoria Bgt. . ix, 326
Eugenia ALB. . ix, 136
Eugenia Pfr. iv, 221; . ix, 331
Euglyptolena Bgt. . ix, 325
Eugoniostoma Bgt. . ix, 259
EUHADRA Pilsbry, . ix, 212
Euhyalina Alb. ii, 10.
Euiberus West. . ix, 328
Eulaba Bgt. iii, 239.
Eulasia Westerl. . ix, 330
EULOTA Hartm. . ix, 200
Eulotella Mouss. . ix, 202
Eumacta M. & P. viii, 135.
Eumæus Lwe. . ix, 254
Eumenes West. viii, 199; ix, 169
Eumona Let. & Bgt. . ix, 250
Euomphalia West. . ix, 264
Euomphalus Blf. iii, 32; ix, 44
Eupæcilia Bgt. . ix, 325
EUPARYPHA Hartm. . ix, 335
Euparypha Authors. . ix, 193
Euphacodes Malz. . ix, 260
Euphemia Leach. . ix, 284
Euphorca Bgt. iii, 230; . ix, 250
Euphorcella Pech. . ix, 251
Euphorcopsis Let. . ix, 251
Euphratica v. Mts. iv, 240; [ix, 319
EUPLECTA Semp. ii, 6, 46.
Eupyramis L. & B. . ix, 263
Eurabdota Bgt. ii, 155.
EURYCAMPTA Martens, ix, 180
Eurychila C. & F. vi, 301; [ix, 156
EURYCRATERA Beck, . ix, 100
Eurycratera H. & A. Ad. ix, 151
Eurydice Gld. iii, 90; . ix, 6
Euryomphala Bgt. ii, 123.
Euryomphala Herrm. . ix, 48
Euryomphala Pfr. ii, 187.
EURYPUS Semp. ii, 8, 110.
Eurystoma Alb. . ix, 114
Eurystyla Anc. . ix, 158
Eurythmia Hartm. . ix, 250
Euryzonus Pfr. . ix, 230
Eusarca Anc. . ix, 251
Eusarcomæ Anc. . ix, 251
Euscepsia Serv. . ix, 266
Euspira Pfr. ii, 207.
Eustilba Bgt. ii, 140.
Eustoma Pfr. vi, 252; . ix, 120
Eustrapa Bgt. . ix, 325
Eustrieta Bgt. iv, 13; . ix, 255
Eustrophes Br. iii, 49.
Euterpe Pfr. ii, 131.
Euthymeana Loc. . ix, 251
Euthyomphala Gall. . ix, 333
Eutropis Shutt. iv, 36; . ix, 289
Euxina Cl. iii, 231; . ix, 250
Evandaleana Pfr. vi, 142; [ix, 131
Evanesens Brod. viii, 20; [ix, 228
Eva Pfr. vii, 78; . ix, 143
Evenosi Bgt. . ix, 251
Everardensis Bedn. viii, 277; [ix, 131
Everetti H. Ad. iii, 211; ix, 124
Evergasta Mab. iv, 171; ix, 327
Evergeta Mab. . ix, 327
Everia Mab. iii, 123; . ix, 289
Exacta Pfr. vi, 250; . ix, 119
Exæquata Gld. ii, 114.
Exagitans Cox, iii, 46; . ix, 33
Exalbida Wood, . ix, 293
Exaltata Pfr. iii, 76; . ix, 5
Exanimata Coop. . ix, 200
Exanthematica v. Mts. . ix, 150
Exarata Pfr. iv, 73; . ix, 199
Exarata Wieg. ii, 21.
Excavata Bean, ii, 153.
Excavata H. & J. . ix, 24
Excellens Pfr. v, 120; . ix, 93
Excelsa Cless. . ix, 307

- Excentrica* Pfr. ii, 105.
Excentrica Sterki, viii, 249; [ix, 283
Exceptiuncula Fér., vi, 289. [ix, 112
Excisa (Selenites) Pfr. iii, 42.
Exclusa Fér. iii, 85; . ix, 5
Excoriata Mart. vi, 22; ix, 156
Excrescens Mouss. ii, 124.
Exdeflexa Pils. v, 198; ix, 181
Exigua Ph. iii, 43; . ix, 41
Exigua Stimp. ii, 203.
Exilis Chemn. ii, 84.
Exilis Pfr. ii, 38.
Eximia Dup. iv, 125.
Eximia Pfr. iv, 75; . ix, 192
*Exocarp*i Cox, vi, 139; . ix, 131
Exoleta Binn. iii, 151; . ix, 77
Exornata Dh. iv, 198; . ix, 293
Exornata Parr. . ix, 325
Expallescens Ziegl. iv, 124.
Expansa Cless. . ix, 274
Expansa Pfr. vi, 298; . ix, 113
Expansilabris Mlldff. vii, [126; ix, 220
Expansilabris Sandb. . ix, 311
Expeditionis Cox, iii, 214; [ix, 130
Explanata Ben. iv, 204; ix, 330
Explanata Müll. iii, 255; ix, 259
Explanata Q. G. ii, 39.
Explanata Schr. iv, 117.
Expolita Desh. ii, 91.
Exposita Mouss. ii, 47.
Exquisita Desh. ii, 146.
Exserta Mts. . ix, 259
Exserta Pfr. ii, 215.
Exserta West. . ix, 259
Exstincta Ramb. . ix, 300
Exsultans Tap.-Can. vii, 31; [ix, 141
Extensa Müll. vii, 114; ix, 221
Extensa Pfr. . ix, 99
Extincta Tap.-Can. vi, 195; [ix, 155
Extricanda Tap.-Can. . ix, 142
Extrusa T.-C. viii, 218; ix, 204
Exulata Smith, ii, 204.
Exul Theob. ii, 93.
*Eydoux*i Hid. vii, 123; . ix, 220
*Eyre*i Ad. & Ang. iv, 66; ix, 114
Eryomphala Beck, . ix, 48
Eyrystoma Mörch. iv, 69.
Ezquerriana Bgt. . ix, 324
Faberiana Möll. vi, 10; ix, 290
Fabrefacta Pse. iii, 45; ix, 25
Fabrei Crosse, i, 115.
Fabricii Beck, ii, 173.
Fabriesi Deb. viii, 168; ix, 250
Faceta Aust. ii, 100.
Faciola Dr. . ix, 206
Facta Newc. iv, 77; . ix, 200
Fagoti Bgt. . ix, 307
Fagoti West. . ix, 252
Faidherbiana Bgt. iii, 189; [ix, 272
Falcata Blf. ii, 58.
Falconeri Rve. vi, 75; . ix, 164
Fallaciosa Fér. iv, 64; . ix, 116
Fallax Auct. iii, 143; . ix, 76
Fallax, Say, . ix, 76
Farafanga Ang. vi, 73; ix, 153
Farafanganensis C. & F. ix, 153
Fargasiana Hde. ii, 217.
Farinesiana Bgt. ii, 149.
Farquhari M. & P. viii, 147; [ix, 38
Farrisi Higg. . ix, 198
Farrisi Pfr. iv, 77; . ix, 198
Fascelina Z. Gred. . ix, 302
Fasciata Blv. . ix, 93
Fasciata Cr. & Fisch. ii, 186.
Fasciata G.-A., iv, 64; . ix, 116
Fasciata Mart. . ix, 112
Fasciata Mouss. . ix, 248
Fasciata Paul, . ix, 271
Fasciata Pils. . ix, 229
Fasciata West, . ix, 266
Fasciatus Penn. . ix, 264
Fasciola Drap. iii, 208; ix, 206
Fasciolata Less. . ix, 112
Fasciolata Loc. iii, 251.
Fasciolata Moq. . ix, 255
Fastigiata DeK. . ix, 73
Fastigiata Hutt. ii, 63.

- Fastigatus* Say, iii, 130; . ix, 73
Fastosus Alb. vi, 79; . ix, 154
Fatigata Cox, iii, 76; . ix, 5
Fatigiata Say, . ix, 73
Fatua Pfr. . ix, 9
Faucicola Hagen. . ix, 305
Faudensis Sullioti, . ix, 331
Faunus Brod. vii, 203; . ix, 227
Faunus Phil. v, 137; . ix, 94
Fausta Lwe. iv, 40; . ix, 241
Faustina Zgl. iv, 95; . ix, 302
Favirensis Parr. . ix, 302
Febigeri Bld. . ix, 73
Febrilis Blf. ii, 55.
Feburiana Auct. . ix, 302
Feddeni Blanf. iii, 163; . ix, 145
Fedtschenkoi Mart. iii, 249; . ix, 255
Fedtschenkopsis Anc. iii, 251.
Feisthameli Hupé, v, 187; . ix, 167
Feneriffensis H. Ad. ii, 130.
Fenestrata Cox, . ix, 19
Fenestrata Sowb. vii, 192; . ix, 225
Fera Bgt. . ix, 256
Ferdinandi Serv. . ix, 275
Feredayi Sut. viii, 74; . ix, 18
Fergusonii Bld. iii, 57; . ix, 50
Fergusonii H. Ad. vii, 32; ix, 141
Ferianica Let. & Bgt. . ix, 251
Fernandezi Hid. viii, 202; . ix, 170
Fernshawensis Pet. ii, 124; . ix, 13
Feroeli (B.) Serv. . ix, 307
Ferrea Morse, ii, 201.
Ferretiana Bgt. iii, 190; ix, 268
Ferrieziana Crosse, i, 118.
Ferruginea Lea, . ix, 222
Ferussaci C. & J. . ix, 325
Ferussaci Less. vii, 30; ix, 141
Ferussaci Pfr. . ix, 141
Fessonina Ang. iii, 79, . ix, 6
Festinans Shuttlw. ii, 160.
Festiva Don. vii, 134; . ix, 222
Festiva Lwe. . ix, 337
Fibula Brod. vii, 94; . ix, 215
Fibula Wood, . ix, 264
Ficta Pse. iii, 62; . ix, 25
Fictilis Brod. viii, 47; . ix, 231
Fictilis Lwe. iv, 38; . ix, 243
Ficium Mühlf. . ix, 32
Fidelis Gray, iv, 69; . ix, 199
Fiesolensis Fag. . ix, 257
Figulina Parr. iv, 247; ix, 320
Filaris Val. vii, 122; . ix, 220
Filia Mouss. iii, 15; . ix, 234
Filiceti Beck, ii, 112.
Filicina Schm. iii, 176; ix, 273
Filicosta Pfr. v, 30; . ix, 184
Filimargo (Z.) Rm. iii, 251; . ix, 259
Filippina Hde. viii, 214; ix, 207
Filiola Fér. iii, 38; . ix, 35
Filocincta Hde. ii, 219.
Filocincta Pfr. ii, 46.
Filocostata Pse. iii, 60; . ix, 27
Filograna Villa, . ix, 250
Filosa Desh. . ix, 322
Fimbriata Bgt. iii, 12; ix, 234
Fimbriata Chier. . ix, 255
Fimbriatus Weth. ii, 200; . ix, 52
Fimbriosa Mart. iii, 158; ix, 146
Finitima Dh. . ix, 73
Finitima Fér. . ix, 288
Finitima Mor. iii, 241; ix, 259
Finschiana Mts. . ix, 205
Firmostyla Mouss. ii, 125.
Fischeri Gass. i, 121.
Fischeri Hid. viii, 29; ix, 228
Flammigera Pfr. . ix, 18
Flammula Semp. viii, 271; . ix, 229
FLAMMULINA Mart. ix, 10, . ix, 338
Flattersiana Anc. . ix, 307
Flatura G.-A. ii, 64.
Flava Hemph. . ix, 199
Flava Terver, . ix, 274
Flaveola Kryn. . ix, 266
Flaveola Mts. . ix, 112
Flavescens Hedl. vi, 151; . ix, 133
Flavescens Parr. . ix, 47

- Flavescens* (Wieg.) Pfr. iv, [75; ix, 68
Flavida Plat. . ix, 272
Flavida Zieg. . ix, 47
Flavidula Mart. vi, 288; ix, 112
Flavolimbata Bttg. iii, 201; [ix, 266
Flavopicta Mlldff. . ix, 342
Flavopurpurea Hde. ii, 216.
Flavovirens D. & M. . ix, 303
Flemingi Pfr. i, 175.
Fleurati Bgt. iv, 129; . ix, 324
Flexilabris Pfr. vii, 49; ix, 140
Flexuosa Pfr. vi, 249; ix, 119
Flindersi Ad. & Ang. . ix, 131
Flocculus Mor. . ix, 47
Floodi Brazier, iii, 46; ix, 13
Flora Pfr. i, 64.
Florentie Pons. viii, 161; [ix, 255
Florentina Fag. . ix, 256
Floresiana v. Mts. . ix, 136
Floridana Hemph. . ix, 73
Florida Sowb. vii, 177; ix, 225
Florulifera Rve. . ix, 73
Florus Cox. viii, 77; ix, 339
Fluctuata C. B. Ad. . ix, 89
Fluctuosa Lwe. iv, 198; ix, 293
Fluminensis Lang. . ix, 318
Foderiana Bgt. ii, 158.
Fodiens Pfr. iii, 212; . ix, 204
Fodinalis Tate, viii, 277; ix, 131
Foedata Hagem. . ix, 250
Foetens C. Pfr. iv, 93; ix, 303
Foetens Stud. . ix, 303
Fetida Stark. ii, 145.
Fogoensis Dohrn, iv, 193; [ix, 294
Folicola Hedley, . ix, 141
Folini Morel. ii, 51.
Foliorum Fag. . ix, 251
Folliculata Risso. . ix, 276
Follis Fer. vi, 74; . ix, 153
Fontainei Colb, . ix, 274
Fontenilli Mich. iv, 100; ix, 302
Footei Stol. iv, 64; . ix, 116
Forabilis Bens. ii, 110.
Forbesi Cox, . ix, 133
Fordei Braz. . ix, 338
Fordiana Pils. v, 141; . ix, 94
Foremaniana C. B. Ad. iii, [7; ix, 64
Foremaniana Rve. . ix, 64
Forensis Woll. iv, 199; ix, 293
Formosa Bgt. ii, 51.
Formosa Fér. v, 90; . ix, 91
Formosa Wood, . ix, 224
Formosensis Pfr. vi, 112; [ix, 214
Fornicata Gld. iii, 27.
Forrestiana Ang. vi, 182; [ix, 131
Forskali Ehr. . ix, 335
Forsteriana Pfr. vi, 127; ix, 132
Forsythi Kob. . ix, 331
Forsythi Paul. iv, 223; ix, 332
Fortis C. B. Ad., Rv. . ix, 90
Fortunata Parr. . ix, 302
Fortunata Sh. iii, 123; ix, 289
Fortunei Pfr. iii, 208; ix, 204
Fourousi Bgt. iii, 194; ix, 266
Foullioyi LeGuill. ii, 87.
Fouqueti Let. iii, 250.
Fouresi Morl. . ix, 124
Foveata Pfr. ii, 20.
Foveolata West. . ix, 249
Fradiniana Bgt. . ix, 274
Fragilis Hemph. viii, 117; [ix, 50
Fragilis Hutt. ii, 103.
Fragilis Pfr. . ix, 58
Fragilis Sowb. vii, 129; ix, 221
Fragillima Mouss. ii, 78.
Fragrans Paul. ii, 189.
Franciscana Gredl. ii, 67.
Franciscanorum Gred. viii, [217; ix, 124
Franki Coop. . ix, 199
Franklandiensis Fbs. iii, [109; viii, 147.
Frappleri Dh. ii, 25.
Fraseri Gray, vi, 150; ix, 133
Frater D. & H. iii, 258; ix, 259
Frater Fér. . ix, 228
Fratercula Pse. iii, 70; ix, 24
Fraterminor Gredl. ix, 146

- Fraterna Say, iii, 142; ix, 78
 Fratisiana L. & B. ix, 251
 Fraudulenta Pils. . ix, 76
 Frauenfeldi Zel. ii, 47.
 Frauenfeldi Zel. . ix, 301
 Frayssina Bgt. . ix, 257
 Frequens Mouss. iii, 193; ix, 272
 Freycineti Pfr. i, 168.
 Freytagiana Dohrn. . ix, 191
 Freytagi Malz. . ix, 272
 Friabilis W. G. Binn. ii, 183.
 Fricata Gld. ii, 213.
 Fricki Pfr. iii, 67; . ix, 25
 FRIDOLINIA Pils. . ix, 294
 Friedeliana Mart. iv, 61; ix, 210
 Friesiana Mildff. vi, 118; ix, 214
 Frigida Jan. iv, 101; . ix, 302
 Frigidescens Del Prete, iv,
 [105; ix, 303
 Frigidissima Adami, . ix, 303
 Frilleyi C. & D. iv, 49; ix, 204
 Fringilla Pfr. vii, 73; . ix, 143
 Fritillata Bens. iii, 33.
 Fritschi Mouss. iv, 170; ix, 327
 Fritzei Bttg. viii, 194; . ix, 4
 Frivaldskyana Rm. iii, 21;
 [ix, 47
Frivaldskyi Calc. . ix, 330
 Frivola Pse. ii, 116.
Frondosula Mouss. ii, 155.
 FRUTICICOLA Held. . ix, 272
 FRUTICOCAMPYLEA Kob.
 [ix, 303
Fruticula Auct. ix, 273
Fruticula Bgt. iii, 204.
 Fruticola Kryn. iii, 200; ix, 272
 Fruticosa Parr. . ix, 267
 Fruticotrochus Kob. . ix, 168
 Fruticum Müll. . ix, 204
 Frutis Parr. . ix, 272
 Fucata Pfr. vii, 14; . ix, 141
 Fuchsiana Heude. ii, 35.
 Fuchsi Gredl. . ix, 204
 Fueredensis Serv. iii, 204.
 Fulgens Sowb. vii, 182; ix, 224
 Fulgetrum Brod. viii, 12; ix, 228
 Fulgetrum Cox, iii, 265.
 Fulgida Parr. ii, 190.
 Fulgurata Sowb. vi, 36; ix, 157
 Fuliginata Mts. vii, 188; ix, 225
Fuliginea Fér. . ix, 91
 Fuliginosa Griff. ii, 185.
 Fulminata Hutt. . ix, 12
 Fulminata Mart. . ix, 112
 Fultoni G.-A. viii, 296; ix, 146
 Fulva Drap. ii, 173.
 Fulvida Pfr. ii, 82.
 Fulvizona Mouss. ii, 74.
 Fulvocarnea Mart. ii, 93.
 Fulvoidea Morel. ii, 175.
 Fulvostraminea, v. Mart. ix, 192
Fumigata Semp. . ix, 225
 Fumosa T.-W. i, 128.
 Funebri Mart. vi, 19; . ix, 156
 Funebri Morel. vi, 301; ix, 156
 Funerea Cox, ii, 209; . ix, 34
Funiculata Pfr. . ix, 122
 Furcillata Hupé, v, 171; ix, 95
 Füredensis Serv. iv, 17; ix, 255
 Furneauxensis Pett. ix, 34, 338
 Furtiva Hde. iv, 60; . ix, 210
 Furva Lwe. iv, 192; . ix, 293
 Fusca Fér. . ix, 307
 Fusca Mont. iii, 186; . ix, 273
 Fusca Q. & M. . ix, 340
 Fuscata Pse. . ix, 6
 Fuscens D. & M. . ix, 307
 Fuscocincta Ad. v, 39; . ix, 183
 Fuscolabiata Poey, v, 34; ix, 184
 Fuscolabiata Rm. iv, 219;
 [ix, 331
 Fuscolabris C. B. Ad. v, 106;
 [ix, 89
 Fuscolutea Grat. ii, 35.
Fuscoradiata Cox, iii, 265;
 [ix, 35
 Fuscosa Sut. . ix, 339
 Fuscosa Ziegl. ii, 189.
 Fuscossuccinea Beck, ii, 107.
Fuscoviridis Grat. . ix, 91
 Fuscozonata Bedd. viii, 83;
 [ix, 26
 Fuscula C. B. Ad. iii, 98; ix, 58
 Futunaensis Mouss. ii, 125.

- Gabata Gld. iv, 57; . ix, 116
Gabbiana Hemp. viii, 119; [ix, 50
 Gabbi Newc. iv, 77; . ix, 200
 Gaberti Less. vii, 48; . ix, 140
 Gabriellæ D. & H. vi, 205; [ix, 104
 Gadensis Bedd. viii, 109; ix, 34 [338
 Gaidurina Bl. & W. . ix, 324
 Gaimardi Dh. vi, 255; . ix, 120
 Galactina Let. & Bgt. iv, 30; [ix, 263
Galactites Lam. . ix, 224
 GALACTOCHILUS Sandb. ix, 310
 Galactostoma Pfr. vi, 44; ix, 157
 Galactostomella Mab. vi, 53; [ix, 157
Galaxias Beck, . ix, 172
 Galdarica Mab. iv, 162; ix, 327
 Galea Bens. iii, 75; . ix, 170
 Galeata Paiva, iv, 41; . ix, 240
 Galeomma Bgt. . ix, 257
 Galena Bgt. . ix, 324
 Galera Hde. . ix, 170
 Galerus Bens. iii, 75; . ix, 4
 Galiffetiana, Bgt. . ix, 326
 Galinieriana Bgt. iii, 190; [ix, 268
Galiziensis Jen. iii, 175.
 Gallæciana Silv, . ix, 44
 Gallandi Bgt. . ix, 333
 GALLANDIA Bgt. viii, 135.
Gallica Bgt. . ix, 303
Gallina Hartm. . ix, 107
 Gallinula Pfr. vi, 219; . ix, 108
 Gallopavonis Val. v, 27; ix, 184
Galloprovincialis Dup. ix, 266
 Gamelia Ang. vii, 10; . ix, 139
Gamma Pfr. . ix, 32
 GANESSELLA Blanf. . ix, 168
 Ganoda Mab. . ix, 341
 Ganoma Pfr. ii, 70.
 Garachicoensis Woll. . ix, 341
 Garciaï Hagenm. . ix, 305
 Gardeneri Pfr. ii, 82.
Gargotte Phil. . ix, 259
 Garibaldiana D. & S. vii, [159; ix, 223
 Garoceliana Loc. . ix, 256
 Garrettii Anc. viii, 95; . ix, 25
Gärtneriana Pfr. . ix, 141
 Gascoynensis Smith, . ix, 343
 Gaskoini Pfr. v, 127; . ix, 93
 Gasparinæ Charp., iv, 102; [ix, 303
 Gassiesi Pfr. iii, 89; . ix, 5
 GASTRODONTA Alb. ii, 12, 197.
 Gattoi Kob. viii, 175; . ix, 250
 Gaudefroyi Mab. . ix, 266
 Gaudiella Mab. vi, 55; ix, 157
 Gaudryi Orb. iv, 177; ix, 327
Gaudryi Rv. . ix, 327
 Gaudryopsis Mab. . ix, 327
 Gaussoini Tryon, v, 197; ix, 183
 Gawleri Braz, ii, 210.
Gayi Hupé, . ix, 165
 Gayndahensis Braz. ii, 215.
 Gealei E. A. Sm. v, 149; ix, 94
 Gelata Cox, vii, 65; . ix, 143
 Gelida Bgt. . ix, 275
Gemellarii Ben. . ix, 335
 Gemina Busch. ii, 36.
 Geminata Mouss. iii, 224; ix, 337
Gemma Hazay, ii, 146.
 Gemma Pfr. ii, 117.
 Gemonensis Fér. ii, 137.
Genardi Braz. . ix, 120
 Generalis Pfr. vii, 137; ix, 222
 Genezarethana Mouss. iii, [199; ix, 268
 Genuarii Paul. iv, 113; ix, 305
 Gentilsiana Crosse, i, 115; [ix, 20
Genuensis Porro, . ix, 322
Genulabris Mart. . ix, 205
 Geoffreyi H. Ad. ii, 106.
 GEOMITRA Swainson, ix, 238, 244
 Georgiana Q. & G. . ix, 14
 Georgiana Quoy, ii, 168.
Geotrochus Beck, . ix, 137
Geotrochus Hasselt, . ix, 1
 Geotrochus Mlldff. vii, 97; [ix, 215

- Gerfalconensis* Pecch. ii, 154.
Gergisensis L. & B. . ix, 336
Gerlachi Möll. iv, 52; . ix, 209
Germani Ph. iii, 43; . ix, 41
Germana Gld. iii, 143; . ix, 78
GERONTIA Hutton, . ix, 14
Gerrardi Sm. . ix, 120
Gerstfeldiana Cless. . ix, 274
Gertrudis Rolle, . ix, 333
Geryvillensis Bgt. iv, 6; ix, 255
Gervaisii Dubr. ii, 31.
Gesneri Hartm. iv, 237; ix, 319
Gesocribatensis Bgt. . ix, 256
Gestroi Tap.-Can. vii, 44;
 [ix, 142
Ghaesiana Mouss. iv, 17.
Ghazouana Deb. iv, 133;
 [ix, 324
Ghiesbreghti Nyst. iv, 75;
 [ix, 192
Ghilanica Mss. iv, 231; ix, 333
Gibboni Pfr. v, 182; . ix, 167
Gibbosa A. Ad. . ix, 169
Gibbosa Mart. ii, 74.
Gibbosobasalis Woll. iv,
 [131; ix, 324
Gibbosula Dh. . ix, 322
Gibbosula H. & J. . ix, 113
Gibilmanica Serv. . ix, 257
Gibsi Leach, . ix, 266
Gigas Bens. i, 179.
Gigas Pfr. ii, 17.
Gigas Smith, i, 61.
Gigas Swains. . ix, 155
Gigantea Scop. v, 73; . ix, 100
Gigaxii Charp. iv, 16; . ix, 255
Gilberti Pfr. vi, 142; . ix, 131
Gilliesi Sm. i, 127.
Gilva Brod. vii, 205; . ix, 227
Gilva Fér. v, 31; . ix, 184
Giramica Lwe. iv, 188; ix, 240
Giraudeliana Hde. viii, 210;
 [ix, 206
Girva Friv., Rm. iii, 118;
 [ix, 288
Giuliae Bgt. . ix, 320
Giurica Bttg. viii, 192; . ix, 277
Glabella Drap. iii, 186; ix, 266
Glabella Puton, iii, 175.
Glaberrima Ben. ii, 151.
Glaberrima Mlldff. ii, 121.
Glaberrima Pfr. ii, 212.
Glaberrima Semp. ii, 112.
Glabra Stud. ii, 146.
Glabriuscula Pfr. iii, 37; ix, 9
Glacialis Sut. . ix, 18
Glacialis Thom. iv, 109; ix, 302
Glandula Beck, ii, 113.
Glanvilliana Anc. viii, 147;
 [ix, 38
Glaphyra Alb. . ix, 282
Glaphyra Say, ii, 155.
Glasiana Sh. iv, 169; . ix, 327
Glaucia Aust. ii, 92.
Glaucia Bens. ii, 88.
Glaucophthalma Pfr. viii, 7;
 [ix, 228
Glischra L. & Bgt. iii, 185.
Glissoni Anc. viii, 82; . ix, 35
Globata v. Mts. . ix, 150
Globosa Aust. ii, 103.
Globosa Brod. . ix, 94
Globosa Friedl. . ix, 47
Globosa Mlldff. . ix, 222
Globosa Paul. . ix, 301
Globosa Semp. ii, 35.
Globosa Sut. viii, 96; . ix, 33
Globosula Mlldff. ix, 220
Globosus G -A. i, 182.
Globula Kryn. iii, 197; ix, 266
Globula Lea. . ix, 205
Globularis Jeffr. . ix, 273
Globularis Schum. . ix, 88
Globularis Ziegl. iv, 206; ix, 330
Globuloidea Terv. iii, 243;
 [ix, 250
Globulosa Bgt. . ix, 333
Globulosa Ckll. viii, 118; ix, 50
Globulosa Fér. . ix, 189
Globulosa Kucik, . ix, 300
Globulosa Mlldff. error
 for globosula, Mlldff.
Globulus Chemu. ii, 81.
Globulus Müll. iii, 213; ix, 173
Globus Less. iii, 174.
Glomerosa Aust. ii, 177.

- Glomus Alb. i, 251; ii, 128.
 Gloriosa Pfr. vi, 68; . ix, 153
 Gloynei Sowb. vii, 165; ix, 224
 Glutinosa Metc. ii, 72.
 Glyceia Mab. iv, 170; . ix, 327
 GLYPTORHAGADA Pilsbry,
 [ix, 129
 GLYPTOSTOMA Bl. & Binn.
 [ix, 192
 Gmeliniana Pfr. vii, 100; ix, 215
 Gobanzi Ffld. iv, 107; . ix, 302
 Godeffroyana Garr. ii, 77.
 Godetiana Kob. iv, 253; ix, 320
 Godeti Sowb. viii, 129; . ix, 5
 Godeti Sut. viii, 68; . ix, 15
 Godwini Try. ii, 101.
 Goldiei Braz. vi, 217; . ix, 141
 Gomeræ Woll. iii, 123; . ix, 289
 Gomerensis Morel. iv, 185;
 [ix, 328
 Gomesiana Pva. iv, 45; . ix, 243
 Goniasmos A. D. Br. v, 102;
Goniochila Pfr. iv, 58; ix, 171
Goniodiscus Auct. . ix, 45
Goniognatha Möreh. ix, xxiii.
 Goniogyra Bgt. . ix, 257
 Goniomphala Pfr. iii, 78; ix, 6
 Goniostoma Mlldff. viii, 221;
 [ix, 122
Gonostoma Binney, . ix, 80
Gonostoma Held. . . ix, 284
 GONOSTOMOPSIS Pilsbry, ix, 91
 Gonostyla Anc. vi, 45; . ix, 158
 GONYODISCUS Fitzinger, ix, 45
 Goodwini Sm. iii, 219; ix, 169
 Goossensi Mab. iii, 184; ix, 275
 Gordonina Bens. ii, 45.
 Gorenduensis Braz. vii, 63;
 [ix, 142
 Gorgonarum Dohrn, iii, 46.
 Gorontalensis Mts. iii, 83;
 [ix, 5
 Gortschana Mouss. iii, 20;
 [ix, 47
Gosse Pfr. . . ix, 183
Gosse Rv. . . ix, 183
Gosseni error for *goossensi*
 [Mab; ix, 275
Gothica L. iv, 117.
 Gotlandica West, . . ix, 307
 Gottschei Möll. iv, 62; . ix, 210
 Goudotiana Fér. vi, 70; ix, 153
 Gougeti Serv. iii, 121; . ix, 288
 Gouini Deb. viii, 170; . ix, 250
 Goulardiana Cr. i, 122; . ix, 54
Gouldi Cox, . . ix, 35
Gouldi Hemph. viii, 116; ix, 50
 Gouldi Pfr. iii, 77; . ix, 4
 Grabhami Woll. . . ix, 245
 Gracilicosta Reinh. viii, 256;
 [ix, 283
Gracilis Lea, . . ix, 228
Gracilis Mlldff. . . ix, 337
Gracilis Poey, . . ix, 58
Gradata Mlldff. . . ix, 169
Gradata (Rhytida) Gld. iii, 38.
Gradilis Mts. viii, 179; . ix, 259
Gradiscanensis Fag. iv, 18.
Græca Kob. ii, 134.
Græca Mart. . . ix, 252
Graellsiana Pfr. iv, 150; ix, 291
Graells Hid. viii, 14; . ix, 228
Græseri Mouss. viii, 205; ix, 206
Graffi Mouss. iii, 65; . ix, 27
Graftonensis Cox, ii, 169.
Graja West. . . ix, 259
Graminicola C. B. Ad. v, 36;
 [ix, 185
Graminum Hde. iii, 207; ix, 204
Granaria Bock. ii, 18.
Granatelli Biv. . . ix, 281
Grandidieri C. & F. vi, 72;
 [ix, 153
Grandiscanensis Fag. . ix, 256
Grandis Mlldff. . . ix, 342
Grandis Pfr. vii, 195; . ix, 227
Granifera Bens. . . ix, 116
Granifera Gray, . . ix, 91
Grannonensis Bgt. . ix, 249
Granomalleata Woll. iv, 178.
 [ix, 328
Granosa Wood, . . ix, 97
Granostriata Mouss. iv, 43;
 [ix, 259
Granti Pfr. . . ix, 209
Granulata Alder, iii, 178;
 [ix, 273
Granulata Q. & G. vii, 90;
 [ix, 125
Granulata Roth. . . ix, 266

- Gularis* Say, ii, 199.
Gulosa Gould, vi, 131; . ix, 131
Gummata Sowb. ii, 85.
Gundlachi Pfr. ii, 174.
Gunni Brazier, . ix, 34
Gunnii Gray, i, 126.
Guppya Moreh. ii, 11.
Guppyi Smith, vii, 19; . ix, 140
Gurgustii Cox, vii, 61; . ix, 142
Gussoneana Sh. iv, 243; ix, 319
Gutierrezii Poey, v, 125; ix, 93
Gutta Pfr. i, 174.
Guttata LeGuill. . ix, 111
Guttata Oliv. iv, 228; . ix, 333
Gypsacea Pfr. ii, 70.
Gypsina Melv. & Pons. viii,
 [262; ix, 173
Gyrata West. iii, 173; . ix, 274
Gyrata West. . ix, 302
Gyrella Morel. iii, 126; . ix, 83
Gyria Roth. iii, 117; . ix, 288
Gyrina Val. v, 131; . ix, 190
Gyroides Parr. iii, 246; ix, 252
Gyroplatys Dohrn, iii, 101.
Gyrostoma Fér. iv, 212; ix, 330
Gysseriana Pfr. iii, 75; . ix, 170

Haasti Hutt. viii, 62; . ix, 9
Habroconus C. & F. ii, 11.
HADRA Albers, . ix, 131
Hadrumetorum Let. & Bgt.
 [ix, 251
Hæmastomus L. vi, 78; ix, 154
Hæmastomus Swains, . ix, 184
Hæmatozona Hde. vi, 119;
 [ix, 214
Haenseli Sch. & Bttg. viii,
 [119; ix, 4
Hæsitans Hde. . ix, 204
Hætereia West., . ix, 301
Hahni Mab. vi, 200; . ix, 104
Haidrana L. & B. . ix, 251
Hainanensis H. Ad. vi, 204;
 [ix, 104
Hainesi Mart. ii, 86.
Hainesi Pfr. ii, 96.
Hainesi Pfr. viii, 26; . ix, 229
Haitensis W. & M. v, 21; ix, 186

Hajnauldiana Haz. iv, 237;
 [ix, 319
Halata Mouss. ii, 71.
Haldemaniana Ad. iii, 8;
 [ix, 64
Halia (Berth.) Bgt. . ix, 256
Halichlora Semp. viii, 32;
 [ix, 229
Halli Cox, iii, 264; ix, 34, 338
Halmaherica Strub. viii, 284;
 [ix, 111
Halmyris Mab. . ix, 331
Halophila Deb. . ix, 251
Hamacenica Raff. iii, 250;
 [ix, 268
Hamadanica L. & B. . ix, 336
Hameliana Crosse, ii, 167.
Hamilcaris Kob. iii, 233; ix, 250
Hamiltoni Cox, iii, 87; ix, 13, 338
Hammonis Strom. ii, 153.
Hamudæ Kob. viii, 182; ix, 259
HAMYA Bgt. ii, 7.
Hamyana Anc. viii, 95; ix, 27
Hanleyi Pfr. vii, 95; . ix, 215
Hanni Braz. vi, 166; . ix, 134
Hapa H. & J. . ix, 6
Haploa West. . ix, 335
HAPLOGONA, . ix, xxix
HAPLOTREMA Anc. ii, 13, 208.
Hardouini Morg. vii, 86; ix, 116
Hardwickei Aust. ii, 100.
Harfordiana Coop. iii, 130;
 [ix, 80
Harfordiana W. G. B. iii,
 [146; ix, 76
Harfordii Sby. vii, 148; ix, 223
Hargravesi Auct. . ix, 139
Hargreavesi Ang. vii, 9; ix, 139
Hariola Bens. iii, 74; . ix, 170
Hariotiana Bgt. . ix, 259
Harlei Fag. ii, 159.
Harmonica Mouss. iv, 185;
 [ix, 328
Haroldi Godw.-Aust. ii, 53.
Harpa Say, iii, 54; . ix, 281
Harpula Reinh. iii, 55; ix, 281
Harrietensis Nev. ii, 126.
Harriettæ Cox, iii, 109; viii, 147.

- Hemioxia* Pils. . . ix, 157
HEMPLECTA Alb. ii, 6, 35.
Hemipleuris Möll. iii, 149; [ix, 279]
Hemipsorica Morel. ii, 155.
Hemisphærica Less. . ix, 274
Hemisphærica Mlldff. viii, [223; ix, 204]
Hemisphærica West. ii, 196.
Hemisphæricion Pfr. vii, 145; [ix, 222]
HEMITROCHUS Swains, ix, 183
Hemonica Thiesse, . ix, 303
Hemphilli Newc. viii, 119; [ix, 50]
Hemphilli W. G. B. ii, 207.
Hemphilli W. G. B. iii, 146; [ix, 76]
Hemprichi Ehr. . . ix, 335
Henuigiana Mlldff. . ix, 215
Henontiana Bgt. iii, 254; ix, 259
Henrici Semp. ii, 104.
Henriettæ Maz. iii, 144; ix, 76
Henriquesi Silv. . . ix, 44
Henryana Pett. . . ix, 10
Hensaniensis Gredl. vi, 299; [ix, 290]
Henschei Pfr. viii, 130; ix, 5
Hepatica Rv. ii, 29.
Hepatizon Gld. ii, 34.
Heptagyra Mlldff. . ix, 337
Heptptycha Q. & M. . ix, 339
Heracleana Bgt. iii, 239.
Herbarum Serv. . . ix, 256
Herbatica Fag. . . ix, 256
Herbicola Shutt. . . ix, 250
Herbini Bgt. iii, 190; . ix, 268
Herculea Ramb. ii, 221.
Heripensis Mab. viii, 158; [ix, 255]
Herklotsiana Dohrn. ii, 37, 43.
Herklotsi Mts. vi, 101; ix, 214
Hermann Pfr. iii, 22; . ix, 341
Hermesiana Pini, iv, 100; ix, 303
Hermia Hutt. viii, 133.
Hermieri (B.) Péch. . ix, 326
Hermione Ang. vii, 21; ix, 140
Heroica Pfr. vi, 217; . ix, 108
Hero Smith, vii, 57; . ix, 141
Herpestes Hde. iv, 60; ix, 210
Herrmannseni Pfr. vi, 98; ix, 213
Herziana Mlldff. vi, 271; ix, 124
Hesperidum Mor. iv, 26; ix, 261
Hessei Kim. iv, 103; . ix, 303
Hestia Dohrn, ii, 35.
Hetvera Pfr. . . ix, 132
Heteroclites Lam. . . ix, 89
Heteroconcha Blanf. i, 176.
Heteromorpha West. iii, 172; [ix, 278]
HETEROSTOMA Hartm. ix, 244
Heterotæniata Pils. . ix, 226
Heudei Hilb. viii, 210; ix, 206
Heuglini Mts. iii, 104; ix, 268
Hexagyra Muhl. . . ix, 267
Heynemanni Kob. viii, 169; [ix, 255]
Heynemanni Pfr. iii, 72; ix, 24
Hians Pfr. v, 194; . ix, 167
Hiaticula West. . . ix, 275
Hiberna Ben. iii, 188; . ix, 272
Hicetorum Loc. iv, 17.
Hickonis Kob. . . ix, 214
Hidalgoana Crse. iii, 93; ix, 6
Hidalgoi Mlldff. viii, 246; ix, 223
Hidalgonis Dör. . . ix, 198
Hierapetrana Malz. . ix, 257
Hierica Bgt. . . ix, 260
Hierochuntina Boiss. . ix, 234
Hierocontin West. ix, 257, 275
Hieroglyphicula Mich. iv, [133; ix, 324]
Hieronymi Dör iv, 78; ix, 198
Hierophanta Mab. iii, 225; [ix, 337]
Hierosolyma Boiss. . ix, 333
Hierosolymitana Bgt. iii, 52; [ix, 44]
Hierroensis Grass. iv, 176; [ix, 327]
Higgins Pfr. iv, 79; . ix, 198
Hildebrandti Dohrn, ii, 35.
Hilgendorffi Kob. iii, 219; [ix, 169]

- Hilgendorfi Reinh. ii, 142.
 Hillebrandi Newc. iv, 70; [ix, 199
 Hillei Gundl. ii, 199; . ix, 65
 Hilli Brazier, vi, 164; . ix, 134
 Hilli Cox, i, 170.
 Hilum Weinl. & Mts. . ix, 58
 Himalayana Lea, ii, 17.
 Hindei Cox, viii, 30; . ix, 229
 Hindsii Pfr. iii, 136; . ix, 74
Hindsii Pfr. . . ix, 230
Hindsii Rve. . . ix, 230
 Hinidunensis Nev. . ix, 148
Hippocastaneum Lam. . ix, 91
 Hippocrepis Pfr. iii, 134; ix 74
 Hipponensis Mor. . ix, 257
 Hirci Cless. . . ix, 266
Hirsuta Brumati. . ix, 302
Hirsuta Jan. . . ix, 276
Hirsuta Say, iii, 140; . ix, 78
 Hirta Mke. iv, 89; . ix, 302
 Hispalina Serv. . . ix, 257
Hispanica Partsch. . ix, 325
Hispanica Sterki. . ix, 283
Hispanica West. viii, 56; [ix, 234
 Hispida L. iii, 172; . ix, 274
 Hispidella Bgt. . . ix, 275
 HISPIDELLA Lowe. . ix, 240
 Hispidosa Mouss. iii, 172; ix, 274
Hispidula Jan. . . ix, 275
 Hispidula Lam. iii, 122; ix, 288
Hispidula Risso, . ix, 254
Histrio Mühlf. . . ix, 41
Histrio Pfr. . . ix, 181
 Hiulca Jan. ii, 150.
 Hixoni Braz. vi, 177; . ix, 134
 Hjalmarsoni Pfr. v, 12; ix, 187
 Hobsoni Braz. i, 126.
Hobarti Cox, iii, 34; ix, 34, 338
 Hochstetteri Pfr. i, 127.
 Hodgsoni Blanf. ii, 119.
 Hodnæ Anc. . . ix, 260
 Hoffmanni Partsch, iv, 99; ix, 300
 Høgeana Mart. . . ix, 192
Hogoleuensis Le Guill, ii, 30.
 Hola Bgt. . . ix, 257
 Holderiana Coop. . ix, 199
 Hollandi C. B. Ad. iii, 9; [ix, 64
 Holmbergi Dör. iii, 43; ix, 41
 Hololeuca Pfr. viii, 37; ix, 229
 Hololoma Mildff. viii, 198; [ix, 280
 Holoserica Stud. iii, 116; ix, 287
Holosericea Gmel. . ix, 287
 Holostoma Pils. v, 18; ix, 186
 Holotricha Bttg. . . ix, 266
 Hombroni Pfr. vi, 258; ix, 121
 Homerica Mart. viii, 239; [ix, 320
 Homeyeri D. & H. iii, 258; [ix, 259
 Homoleuca Parr. . . ix, 253
 Hondana Pfr. ii, 165.
 Honesta Gld. ii, 111.
 Hongkongensis Dh. iii, 206; [ix, 205
 Hongkongensis Mildff. ii, 68.
 Honorati Bgt. . . ix, 257
 Hookeriana Johnst. iii, 87; [ix, 34
 Hookeri Rve. iii, 48; . ix, 41
 Hopetonensis Shutt. iii, 144; [ix, 76
Horderi Sowb. vii, 29; ix, 141
 Horiomphala Pfr. iv, 51; ix, 337
 Hornii Gabb. iii, 21; . ix, 57
 Horrida Pfr. vi, 9; . ix, 290
 Horripila M. & D. iii, 222; [ix, 240
 Horripilosella Hde. iii, 183; [ix, 275
 Horizontalis Pfr. vi, 232; [ix, 109
Hortensis Ménétr. . ix, 304
 Hortensis Müll. iv, 123; ix, 322
Hospitans Bon. iv, 215; ix, 331
 Hottentota M. & P. viii, 141; [ix, 39
 Houaiensis Cr. iii, 149; ix, 279
 Hova Angas, vi, 24; . ix, 156
 Howardi Ang. iv, 52; . ix, 129
 Howinsulæ Cox, viii, 133.
 Hoyti Garr. ii, 77.
 Huaheiuensis Pfr. iii, 61; ix, 26

- Huancensis Ph. iv, 79; ix, 198
 Hubbardi A. D. Brown, iii, 139.
 Huberiana Hde. iv, 49; ix, 204
 Hudsoniæ Bens. iii, 108; viii, 135
 Hueensis Wattebl. ii, 220.
 Huetiana Ben. iv, 221; ix, 331
Hueti Pfr. . . . ix, 331
 Hugeli Pfr. . . . ix, 215
 Hugonis Pfr. ii, 18.
 Humberti Brot. iii, 156; ix, 148
 Humboldtiana Fér. iv, 260; [ix, 192
Humboldtiana Iher. . ix, 191
 Humilis Hutt. iii, 22; ix, 44
 Humphreysiana Lea, ii, 36.
 Humulicola Mab. ii, 141.
 Hunancola Gredl. . ix, 209
 Hungarica West. ii, 146.
 Hungerfordiana Nev. iii, [182; ix, 124
 Hungerfordiana Theob. ii, 133.
Hunnaensis Sut. . . ix, 339
 Hunteri Cox, vii, 105; ix, 220
 Hunuaensis Sut. . . ix, 28
 Hupeana Gredl. iv, 259; ix, 210
 Hupensis Gredl. iv, 54; ix, 209
Huttonella Suter, . . ix, 27
 Huttoni Pfr. iv, 54; . ix, 209
 Huttoni Sut. viii, 104; ix, 32
 Hyæna Lwe. iv, 192; . ix, 293
 Hyalea Beck, i, 180.
Hyalina Ad. ii, 201.
Hyalina Fér. ii, 142.
 Hyalina Le Guill. vii, 88.
 Hyalina Mart. ii, 90.
 HYALINIA Fér. ii, 10, 137.
 Hyalinus Pfr. i, 172.
 HYALOSAGDA Mart. . ix, 64
 Hyba Bens. iii, 93.
 Hyblensis Parr. ii, 143.
Hybrida Hemp. . . ix, 50
 Hydatina Rossm. ii, 144.
Hydeanus Mart. . . ix, 95
Hydiana Lea, . . ix, 95
 Hydrophana Sowb. vii, 187; [ix, 225
Hydrophila Ingalls, ii, 171.
 Hydruntina Bl. iii, 230; ix, 250
- HYGROMIA Risso, . ix, 269
 Hylephila Orb. i, 64.
 Hyllica Brus. . . ix, 301
 Hylonomia Bgt. . . ix, 271
 Hymetti Mouss. . . ix, 303
 Hypæana Bgt. . . ix, 256
 Hyperbolica Sdb. . . ix, 295
 Hyperconica Bgt. . . ix, 260
Hyperplatea Serv. . ix, 336
 Hyperteleia Morl. viii, 203; [ix, 170
 Hyphasma Pfr. ii, 58.
 Hypnicola Mab. . . ix, 307
Hypocrita Dohrn, . ix, 45
Hypogæa Bgt. ii, 145.
 Hypolepta Shutt. viii, 111; [ix, 58
 Hypoleuca Blanf. ii, 94.
 Hypophleæa Ph. iii, 43; ix, 41
 Hypophysa West. . ix, 344
 Hypopolia Pfr. ii, 181; ix, 12
Hypoptychus Pils. . . ix, 226
 Hypsellina Loc. . . ix, 275
 HYPSELOSTYLA Martens, ix, 228
 Hyptiocyclos Bens. iii, 46.
 HYSTRICELLA Lowe, . ix, 242
 Hystricelloides Mouss. iii, [65; ix, 27
Hystrix Cox, . . ix, 122
 Hystrix Migh. iii, 59; . ix, 27
 Iaddæ Pils. vi, 276; . ix, 111
 Iadola Bgt. . . ix, 266
 Ianthe Smith, vii, 58; . ix, 141
 Ianthinostoma L. & B. ix, 250
 Ibaraoensis Ang. vi. 61; ix, 152
Iberica Ramb. . . ix, 254
 IBERUS Montf. . . ix, 328
 Ibrahimi Bgt. . . ix, 324
 Ibuensis Marts. ii, 51.
 Ichthyomma Held. iv, 93; [ix, 303
 Icterica Tib. ii, 189.
 Ida Auct. . . ix, 17
 Idæ Pfr. i, 178.
 Idahoensis Newc. iii, 55; ix, 50
 Idaliæ Bgt. iv, 28; . ix, 263
 Idanica Loc. . . ix, 256

- Ide Gray, ii, 210; . ix, 17
 Idia L. & B. iii, 256; . ix, 260
 Idiophya Flor. . ix, 256
 Idiotrypa Mab. iv, 168; [ix, 327
 Idryta Mab. iv, 161; . ix, 327
 Ierensis Gupp. iii, 55; . ix, 57
 Ignava Pfr. iii, 36; . ix, 35
 Ignescens Pfr. ii, 76.
 Igniflua Rve. i, 129; . ix, 13
 Ignobilis Sowb. vii, 180; ix, 225
 Ignota Mab. . ix, 255
 Illasyaca Adami, . ix, 301
 Illauta Bgt. ii, 145.
 Illobata Parr. iii, 249; . ix, 255
 Illicetorum Mab. . ix, 256
 Illicis Florence, . ix, 251
 Illicita Mouss. . ix, 234
 Illusana Serv. . ix, 307
 Illustris Pfr. vi, 201; . ix, 104
 Illuviosa Nev. . ix, 254
 Illyrica Stab. iv, 90; . ix, 301
 Iloconensis Sowb. vii, 175; [ix, 226
 Imbellis Hde. ii, 68.
 Imberbis Brus. iv, 97; . ix, 301
 Imitata Smith, . ix, 343
 Immaculata A. & R. . ix, 169
 Immaculata Pils. . ix, 215
 Immerita Blf. ii, 16.
 Immersa Gundl. . ix, 182
 Immodica Mouss. . ix, 261
 Immunda C. B. Ad. iii, 99; [ix, 58
 Impatiens Hde. . ix, 204
 Imperator Gld. i, 179.
 Imperator Montf. v, 79; ix, 98
 Imperator Pfr. vii, 199; ix, 227
 Imperatrix Gundl. v, 180
 Imperatrix West. i, 179.
 Imperfecta Dh. ii, 28.
 Imperforata Pse. iii, 68; ix, 27
 Imperforatum Spix, i, 64.
 Impexa Rve. ii, 212.
 Implicans Guppy, ii, 164.
 Implicata (Beck) Mart. iii, 133; ix, 74
 Implicata Nev. ii, 24.
 Impressa Blv. . ix, 180
 Improbata Mouss. iv, 12; ix, 255
 Improvisa Hde. iii, 220; ix, 204
 Impugnata Mouss. iii, 226; [ix, 337
 Impura Pfr. iii, 50; . ix, 57
 Inæqualis Pfr. i, 121.
 Inaguensis Weidl. iii, 41; ix, 58
 Incarnata Müll. iii, 187; ix, 272
 Incarum Phil. v, 192; . ix, 167
 Incei Pfr. vi, 167; . ix, 134
 Incerta A. Ad. ii, 178.
 Incerta Drap. ii, 191.
 Incerta Fé. v, 57; . ix, 97
 Incerta Mouss. Pfr. . ix, 26
 Incerta Pfr. . ix, 171
 Incertus Semp. i, 174.
 Inchoata Morel. iii, 200; ix, 272
 Incincta Mart. . ix, 204
 Incisa Pfr. ii, 163.
 Incisogranulata Woll. . ix, 328
 Inclara Morel. . ix, 340
 Inclinata Pfr. ii, 46.
 Incolumis Bgt. . ix, 256
 Incompta Sowb. viii, 28; ix, 229
 Inconspicua C. B. Ad. iii, 99; [ix, 58
 Inconspicua Forbes, ii, 212.
 Inconvicta Sm. . ix, 343
 Incrassata Rve. . ix, 58
 Incrustata Poey, ii, 204; ix, 57, 58
 Inculta Gass. iii, 26; . ix, 33
 Indecorata Gld. ii, 126.
 Indentata Say, ii, 160.
 Indica Bens. ii, 90, 91.
 Indica Pfr. ii, 42, 98.
 Indifferens Mouss. iv, 177; [ix, 327
 Indioensis Yates, . ix, 199
 Indiscreta Beck, . ix, 93
 Indistincta Fé. v, 14; . ix, 186
 Indusiata Pfr. vii, 184; ix, 224
 Induta Pfr. ii, 78.
 Induta Tate, i, 252.
 Inermis Morel. ii, 160.
 Inermis Mouss. iii, 41; ix, 35
 Inermis Theob. ii, 133.
 Infanda Semp. viii, 120; ix, 5

- Infans* Pfr. ii, 95.
Infantilis Gredl. ii, 216; ix, 168
Infausta Blanf. ii, 103.
Infecta Parr. . . ix, 50
Infecta Rv. iii, 23; . ix, 32
Inflata Blz. . . ix, 301
Inflata Dh. . . ix, 99
Inflata Mlldff. vi, 199; ix, 103
Inflatus Rve. i, 172.
Inflecta Say, iii, 146; . ix, 76
Inflexa Klein, . . ix, 300
Informis Mouss. viii, 282; ix, 134
Infortunata Pfr. ii, 201.
Infracinctus Hde. ii, 216.
Infracostata Westerl. . ix, 341
Infrastrinata Sm. iii, 80; ix, 5
Infrendens Gld. ii, 132, 220.
Infula Bens. ii, 52.
Infulata Paul, . . ix, 263
Infumata Gld. iv, 70; . ix, 199
Infundibulum H. & J. . ix, 18
Infuscata Alb. vii, 152; ix, 223
Ingallsiana Shutt. . ix, 77
Ingenua Bgt. . . ix, 251
Ingens C. B. Ad. v, 103; ix, 89
Ingersolli Bld. iii, 101; ix, 57
Ingloria Hde. . . ix, 170
Ingoi Cafic. . . ix, 256
Ingrami Blanf. iii, 69.
Inhluzana M. & P. . ix, 173
Initialis Hde. iv, 62; . ix, 210
Injussa Blf. ii, 55.
Innominata Gray, . ix, 242
Innominata Hde. viii, 197; [ix, 207
Inornata Kob. . . ix, 301
Innoxia Bgt. . . ix, 266
Inopinata Dh. viii, 207; ix, 206
Inops Morel. . . ix, 340
Inops, Mouss. iv, 26; . ix, 263
Inornata H. & J. ii, 77.
Inornata Rossm. . ix, 301
Inornata Say, ii, 184.
Inozonites Pfr. ii, 6, 46.
Inquinata Busch, ii, 82.
Inquieta Dohrn, viii, 273; [ix, 124
Insculpta Pfr. ii, 48.
Insignis Bgt. ii, 51.
Insignis Branc. . . ix, 319
Insignis d'Orb. ii, 164, i, 66.
Insititia Shutt. v, 121; . ix, 93
Insolida Auct. . . ix, 301
Insolita Zgl. iv, 98; . ix, 301
Instabilis Zieg. iii, 248; ix, 252
Instricta Mart. . . ix, 111
Instrumosa Dall, . ix, 185
Insubrica Jan. iv, 101; ix, 302
Insularia Tap.-Can. . ix, 136
Insularis Ben. iv, 206; ix, 331
Insularis Cr. & Deb. iv, 112; [ix, 305
Insularis Iss. . . ix, 259
Insularum Beck, . . ix, 73
Insularum West. . . ix, 204
Intaminata Gld. . . ix, 219
Integrivittis Anc. . . ix, 324
Intensa Pils. v, 22; . ix, 186
Intensior Pils. vi, 28; . ix, 157
Intensior Pils. . . ix, 226
Interamnensis Bgt. . ix, 319
Intercarinata Migh. . ix, 26
Intercedens Retowski, . ix, 322
Intercisa W. G. B. iv, 74; [ix, 200
Intermedia C. & F. . ix, 190
Intermedia Fér. iv, 109; ix, 303
Intermedia Mlldff. . ix, 337
Intermedia Paul, . . ix, 302
Intermedius Alb. i, 61.
Intermissa Mouss. ii, 193.
Intermixta Mouss. . ix, 25
Interna Say, ii, 198.
Interpres West. iii, 242; ix, 252
Interrupta Bens. ii, 17.
Intersecta Mich. iv, 13; ix, 255
Intertexta Binn. ii, 196.
Intestinalis Schlüt. . ix, 284
Intincta Shutt. vii, 154; ix, 220
Intonsa Godw.-Aust. ii, 60.
Intonsa Pils. viii, 111; . ix, 57
Intorta Sowb. vii, 125; ix, 220
Introducta Zgl. iii, 242; ix, 250
Introferens Bld. iii, 145; ix, 76
Intumescens Bens. ii, 16.
Intumescens Mts. iv, 54; ix, 209

- Intusplacata* Pfr. viii, 240; [ix, 326
Inusta Cox, ii, 209; . ix, 34
Inutilis Mouss. iv, 181; ix, 328
Invalida C. B. Ad. v, 117; [ix, 90
Invasa Pfr. iii, 101.
Invernica Mouss. iv, 174; [ix, 327
Inversa West. . ix, 266
Inversa West. . ix, 275
Inversicolor Fér. ii, 24.
Invia Hde. iii, 165; . ix, 146
Ionstoma L. & B. . ix, 250
Iopharynx Mörch. . ix, 4
Iota Pfr. . ix, 16
Iparia Ben. iv, 209; . ix, 330
Iphigenie Deb. . ix, 252
Irana Hagenm. . ix, 257
Iriana Poll. . ix, 254
Iris Mill. v, 195; . ix, 167
Irosinensis Hid. vii, 121; ix, 220
Irradians Pfr. i, 176.
Irradiata Gld. . ix, 339
Irregularis Fér. . ix, 335
Irregularis Mouss. . ix, 35
Irregularis Semp. iii, 67; ix, 26
Irregularis Sut. viii, 98; ix, 32
Irrita Berth. . ix, 257
Irrorata Say, . ix, 324
Irrorata Ziegl. iii, 103; . ix, 37
Irvine Cox, iii, 46; . ix, 13
Irus Lowe, . ix, 241
Isabella Fér. v, 85; . ix, 91
Isabellensis Souv. . ix, 220
Isabellina Pfr. ii, 40.
Isabellina Pils. v, 85; . ix, 91
Isæa Hagenm. . ix, 257
Isaræ Paul. viii, 236; . ix, 331
Isarica Loc. . ix, 273
Ischnia Mab. . ix, 275
Ischurostoma B. . ix, 257
Isilensis Paul. iv, 215; . ix, 331
Isis Pfr. vi, 256; . ix, 121
Isodoma Jan. ii, 137.
Isodon Pfr. v, 175; . ix, 95
ISOGNOMOSTOMA Fitzinger, [ix, 308
Isognomostomos Gm. . ix, 309
Isomera Friv. . ix, 249
ISOMERIA Albers, . ix, 93
Isseliana Paul. ii, 191.
Isseli Morel. iii, 105; . ix, 268
Isserica Kob. viii, 57; . ix, 234
Isserica Let. ii, 157.
Istera Let. & Bgt. . ix, 255
Istrianæ Stoss. . ix, 301
Itala Linn. . ix, 252
Iuloidea Forbes, ii, 209; ix, 34
Iulus Woll. . ix, 341
Jaccetanica Bgt. ii, 152.
Jachnoi Cless. viii, 172.
Jacksoni Bld. iii, 134; . ix, 73
Jacksoniensis Gray, ii, 113.
Jacobensis Ad. v, 41; . ix, 183
JACOSTA Gray, . ix, 258
Jacquementana Bgt. iv, 130.
Jacquemonti Mart. ii, 108.
Jacquetta Hutt. viii, 76; [ix, 18
Jacquinoti Pfr. iii, 71; . ix, 24
Jactata Gundl. . ix, 93
Jaculata Mab. vi, 120; . ix, 104
Jænensis Cl. iii, 51; . ix, 44
Jagoriana, ii, 20.
Jainiana God.-Aust. ii, 91.
Jaintiaca G.-Aust. ii, 63.
Jalapensis Streb. ii, 187.
Jamaicensis Gmel. v, 75; ix, 100
Jamesi Braz. i, 125.
Jamuensis Theob. ii, 109.
Janeæ S. & P. . ix, 26
Janeirensis Pfr. viii, 150; ix, 83
Jannellei LeGuill, vi, 182; [ix, 135
Janellii Hombr. & Jacq. ix, 121
Janira Alb. . ix, 109
Janthina Mab. iv, 156; ix, 327
JANULUS Lwe. ii, 13, 204.
Janulus Pfr. ii, 176.
Janus Chemn. ii, 19.
Japonica Dh. . ix, 213
Japonica Mldff. ii, 104.
Japonica Pfr. iii, 218; . ix, 169
Jasonis Dub. iii, 199; . ix, 268

- Jaspidea* Pfr. iv, 79; . ix, 198
Jaspidea Mab. iv, 215; . ix, 331
Jauberti Bgt. . ix, 320
Jaudenesi Cism. v, 14; . ix, 187
Javanica Lam. ii, 80.
Javanica Mart. iii, 82; . ix, 5
Jayana C. B. Ad. iii, 6; . ix, 64
Jaylei Pal. viii, 164; . ix, 255
Jeanbernati Bgt. . ix, 256
JEANNERETIA Pfr. . ix, 180
Jeannereti Pfr. iii, 53; . ix, 58
Jeannotiana Terv. iii, 11; . ix, 234
Jebusitica Roth. ii, 194.
Jeffreysiana Pfr. i. 129.
Jejuna Say, iii, 154; . ix, 77
Jenyusi Pfr. ii, 50.
Jervisensis Q. & G. vi, 141; .
 [viii, 281; . ix, 131
Jessica Hutt. viii, 85; . ix, 27
Jetschini Ulic. iv, 117; . ix, 306
Jickelii Cless. ii, 140.
Jickelii Nev. iii, 230; . ix, 268
Joannis Mort. iv, 86; . ix, 304
Jobaeana Cr. iv, 142; . ix, 325
Johannis Poey, iii, 130; . ix, 74
Johnstonei Braz. vi, 170; . ix, 134
Jolyi Pech. . ix, 260
Jonasi Pfr. viii, 32; . ix, 229
Joppensis Roth. iii, 244; . ix, 250
Josephina Fér. v, 88; . ix, 91
Jourdaniana Bgt. iv, 136; .
 [ix, 324
Jourdeuili Ray. ii, 158.
Jourdyi Morl. viii, 219; . ix, 204
Jousseauinei Fag. iv, 18.
Jovia Mab. viii, 156; . ix, 146
Juanita Ang. iii, 77; . ix, 5
Jucunda Pfr. ii, 93.
Jugalis Hemph. viii, 117; .
 [ix, 50
Jugallsiana Alb. . ix, 77
Jugatoria Auc. iii, 166; . ix, 146
Juglaus Pfr. vii, 209; . ix, 228
Jugosa Migh. iii, 59; . ix, 27
Juilleti Terv. iv, 134; . ix, 324
Julia Fér. v, 105; . ix, 89
Juliana Gray, ii, 70.
Juliana Poey, . ix, 182
Juliformis Cox, iii, 263; . ix, 35
Juliformis Lwe. . ix, 244
Juloidea Forbes, ii, 209. ix, 34
Jungermanniae Pett. iii, 87; .
 [ix, 34, 338.
Jungermanniarum Ph. iii, .
 [43; . ix, 41
Juno Mazyck=Pœcilozonites.
Juno Pfr. v, 152; . ix, 94
Juriniana Bgt. iii, 188; . ix, 272
Jusiana Bgt. . ix, 249
Justini Mab. iv, 159; . ix, 327
Justi Pfr. . ix, 186
Juxtidens Pils. . ix, 76

Kabyliana Deb. . ix, 251
Kadapaensis Nev. ii, 15.
Kala Aust. ii, 101.
Kalaritana Pr., Villa, . ix, 318
Kalganensis Mildff. . ix, 206
KALIELLA Blan. ii, 7, 61.
Kanakina Gass. i, 122; . ix, 33
Kandiensis Nev. ii, 99.
Kantavuensis Garr. viii, 127; .
 [ix, 6
Kappa Pfr. . ix, 13
Karenorum Blauf. iii, 164; .
 [ix, 145
Kashmirensis Nev. ii, 24.
Katauensis Tap.-Can. . ix, 142
Katostoma Lowe, . ix, 291
Kawaiensis Pfr. ii, 170.
Kelibiana L. & B. . ix, 263
Kellettii Fbs. iv, 119; . ix, 200
Kempseyensis Cox, ii, 178.
Keppelli Pfr. i, 170.
Keppelli Pfr. ii, 106.
Kermadeci Pfr. ii, 123.
Kermorani Coll. . ix, 308
Kershawi Braz. viii, 293; . ix, 164
Kershawi Pett. . ix, 34
Kezamahensis G.-Aust. ii, 65.
Khangetina L. & B. . ix, 251
Khasiaca Aust. ii, 63, 111.
Khasiensis Nev. iv, 64; . ix, 116
Kiangsinensis Mts. viii, 216; .
 [ix, 212
Kierulfi Mörch. iii, 86; . ix, 4

- Kiesneri* LeGuill. . . ix, 113
Kingi Brazier, iii, 46; . ix, 13
Kingi Pfr. . . ix, 41
Kingstonensis Cox, iii, 266; [ix, 35
Kiowaënsis Simp. viii, 155; [ix, 76
Kivaensis Grt. ii, 124.
Kivi Gray, iii, 37; . ix, 339
Kjellerupi Mörch. iii, 74; [ix, 4
Klecaki Pfr. . . ix, 301
Kleciachi Parr. iv, 99; . ix, 301
KLIKIA Pils. . . ix, 289
Knitteli (B.) Serv. . ix, 307
Knoxvilliana Fér. . ix, 77
Knysnaënsis Pfr. iii, 106; [viii, 135.
Kobeltiana Cless. iv, 90; ix, 301
Kobeltiana Deb. . . ix, 234
Kobeltiana Paul. iv, 107; [ix, 301
Kobeltiana Pfr. vi, 228; ix, 109
Kobeltiana West. . ix, 260
Kobelti Mldff. vii, 160; ix, 223
Kobelti West. . . ix, 335
Kobensis Bttg. . . ix, 304
Kobensis Schm. & Bttg. viii, [196; ix, 210
Kochiana Mldff. vi, 231; [ix, 109
Kochi Pfr. . . ix, 50
Kohlbergi Mill. v, 148; ix, 94
Koliaensis Aust. ii, 98.
Koliaensis G.-A. ii, 101.
Kollari Zel. iv, 94; . ix, 303
Komarowi Bttg. ii, 145.
Kompsa Mabilie, . . ix, 341
Koondaensis Blanf. ii, 130.
Kooriogensis Angas, vi, 191; [ix, 129
Kopnodes W. G. B. ii, 183.
Korægælia B., Loc. . ix, 318
Koreana Pfr. . . ix, 213
Korekouke Beck, ii, 76.
Kororensis Bedd. viii, 84; [ix, 26
Kotschy Pfr. . . ix, 255
Koutaisiana Mouss. ii, 158.
Koutoumensis Gass. ii, 167; [ix, 33
Kralicki Let. ii, 158.
Kraussi Pfr. iv, 50; . ix, 173
Kreffti Cox, ii, 219.
Kreglinger Zel. . . ix, 277
Kreitneri Hilb. viii, 211; ix, 206
Krizensis Bgt. iv, 19.
Krugiana Mart. . . ix, 58
Krüperi Bttg. . . ix, 303
Krynicky Cless. ii, 151.
Krynicky Andr. iii, 247; ix, 249
Kryzensis Bgt. . . ix, 256
Kuangsiensis Try. ii, 55.
Kuhni Pfr. v, 189; . ix, 166
Kumahensis Theob. & Stol. [ii, 88.
Kurdistana Parr. iv, 230; [ix, 333
Kurri Pfr. vi, 287; . ix, 112
Kusmici Cless. . . ix, 274
Küsteri Held. . . ix, 252
Küsteri Pfr. iii, 80; . ix, 6
Kutaisiana Mouss. ii, 192.
Kutschigi Parr. ii, 141.
Labiata Pfr. ii, 107.
Labilis Gld. ii, 178.
Labillardierei Smith, vii, 75; [ix, 143
Labiosa Gld. . . ix, 76
Labiozonalis Grat. . ix, 228
Labium Fér. vii, 38; . ix, 142
Labrella Grat. . . ix, 231
Labrella Lam. . . ix, 156
Labropurpureus Grat. . ix, 228
Labrosa Bld. iii, 141; . ix, 78
Labuanensis Pfr. ii, 48.
Labyrinthica Say, iii, 138.
LABYRINTHUS Beck, . ix, 94
Labyrinthus (Chem.) Dh. [v, 161; ix, 95
Lacerata Pfr. vii, 189; . ix, 225
Lacerata Semp. iii, 67; . ix, 26
Lacerata Semp. viii, 36; ix, 230
Lacerturum Bgt. . . ix, 250
Lachesis Fér. vi, 41; . ix, 157

- Laciniata* Hde. iv, 53; . ix, 209
Laciniosa Hde. . . ix, 209
Laciniosa Lwe. iv, 36; . ix, 241
Laciniosula Hde. iv, 53; . ix, 209
Lacosteana Mor. iii, 255; . ix, 259
Lactea Hemph. viii, 118; . ix, 50
Lactea Müll. iv, 130; . ix, 324
Lactea Semp. ii, 118.
Lacteolata=*lacteolota*.
Lacteolota Smith, vii, 25; . ix, 142
Lacticini Zgl. . . ix, 301
Lactiflua Pfr. vii, 108; . ix, 220
Ladacensis Nev. viii, 260; . ix, 284
Læta Gld. iv, 47; . ix, 204
Læta Pfr. ii, 86.
Læsa Rve. iii, 214; . ix, 130
Lævigata Moq. . . ix, 283
Lævigata Pfr. ii, 184.
Lævipēs Müll. ii, 17.
Lagarinæ Adami, iv, 238; . ix, 319
Lagunæ Hid. . . ix, 104
Lahatensis Morg. iii, 267.
Laidlayana Bens. ii, 15.
Lailangkotensis G.-A. ii, 65.
Lais Pfr. vii, 121; . ix, 220
Lalannei Gass. iii, 73.
Lallemantiana Bgt. iv, 6; . ix, 255
Lalliana Tristr. . . ix, 190
Lalloensis Pfr. vii, 136; . ix, 222
Lamalouensis Reyn. . ix, 266
Lamareckiana Lea, ii, 32.
Lamareckii Fér. v, 102; . ix, 89
Lamarei Mke. vi, 25; . ix, 156
Lamarmoræ Malz. . ix, 305
Lambda Pfr. . . ix, 13
Lambeii Pfr. vii, 48; . ix, 140
Lamberti Gass. i, 122.
Lamberti Cr. iii, 26; . ix, 33
Lamellata Jeffr. iii, 54; . ix, 281
Lamellicosta Grt. iii, 39; . ix, 27
Lamellicosta Pfr. . ix, 97
Lamellicostata Grt. iii, 39; . ix, 35
Lamellifera C. B. Ad. iii, 8; . ix, 64
Lamellina Newc. . . ix, 58
Lamellosa Fér. iii, 67; . ix, 25
Laminata Pse. . . ix, 25
Laminifera Mlldff. iii, 165; . ix, 146
Laminifera W. G. B. . ix, 73
LAMPADIA Lowe, . ix, 294
Lampadion Bolt. . ix, 92
Lampas Martyn. ii, 34.
Lampas Müll. vi, 194; . ix, 155
Lampedusæ Kob. viii, 175; . ix, 249
Lampra Pfr. i, 125.
Lamprimathia Bgt. . ix, 326
LAMPROCYSTIS Pfr. ii, 9.
Lamproides Cox, i, 124.
Lanceolata Pfr. vii, 34; . ix, 141
Lancerottensis W. & B. iii, [237; . ix, 258
Lanciformis Bttg. vi, 39; . ix, 157
Lancula Fér. vi, 36; . ix, 157
Langei Bgt. . . ix, 272
Langi Parr. iv, 102; . ix, 301
Langi Pfr., Bttg. . . ix, 301
Langleyana Braz. . ix, 13
Langloisiana Bgt. iv, 15; . ix, 255
Langsdorffi Mill. . . ix, 274
Languescens Hde. . ix, 210
Langnida Pfr. vii, 189; . ix, 225
Lanieriana Orb. . ix, 187
Lanosa Mouss. iii, 223; . ix, 276
Lansbergiana Dohrn, vi, [247; . ix, 119
Lansingi Bld. iii, 102; . viii, 111.
Lanuginosa Boiss. iii, 180; . ix, 274
Lanx Fér. vi, 38; . ix, 157
LAOMA Gray, . . ix, 8
Laomontana Pfr. iii, 160; . ix, 146
Lapicida L. iv, 116; . ix, 299
Lapidicola Mühlf. ii, 134.
Lapidosa Anc. iii, 238.
Lapithoensis Rolle, . ix, 333
Laqueata Baird, ii, 215.
Lardea Mts. iii, 83; . ix, 5
Lardyi Charp. ii, 124.
Largillierti Ph. iii, 218; . ix, 169
Larryi Braz. . . ix, 164

- Larvata Brod. viii, 48; ix, 231
 Lasallii Eyd. vi, 233; . ix, 109
 Lasia Bgt. iii, 179; . ix, 274
 Lasmodon Phill. ii, 197.
 Lassevillei Gundl. v, 14; ix, 187
 Latastei Let. . . ix, 251
 Latasteopsis L. & B. . ix, 251
 Latebricola Bgt. ii, 144.
 Latebrosa Dall, . . ix, 185
Latecava Mouss. . . ix, 320
 Latecostata Kobelt, . ix, 343
 Latens Lwe. iv, 35; . ix, 241
 Lateumbilicata Sut. viii, 64;
 [ix, 9
 Lathræa Bgt. . . ix, 256
Latiaxis Smith, . . ix, 142
 Laticensis Loc. . . ix, 274
 Laticlavaria Mart. . . ix, 112
 Latidentata Mill. v, 156; ix, 94
 Latilabris Mlldff. vi, 109; ix, 214
 Latilabris Westerl. . ix, 331
 Latimarginata Sm. iii, 92;
 [ix, 6
 Latinea Paiva, iv, 36; . ix, 241
 Latiniacensis Loc. . ix, 274
 Latissimus Dohrn, ii, 137.
 Latitans Brod. vii, 167; ix, 224
 Latizona Pfr. vi, 285; . ix, 112
Latonus Fitz. . . ix, 298
Latonia West. . . ix, 271
 Latrunculorum Hde. iii,
 [221; ix, 204
 Launcestonensis Reeve, vi,
 [93; ix, 161
Lauracina Fag. . . ix, 250
 Lauraguaisiana Loc. iv, 19.
 Laurentii Bgt. . . ix, 330
 Laurentii Gredl. iv, 259; ix, 170
 Laurinæ Iss. viii, 166; ix, 249
Lauta Lwe. iii, 235; . ix, 249
Lautaretina Bgt. . . ix, 249
 Lautsi Schm. & Bttg. viii,
 [193; ix, 209
Lavalleana d'Orb. ii, 202; ix, 342
 Lavanduke Bgt. . . ix, 275
Lavata Tib. . . ix, 266
 Lavinia Hutt. viii, 74; ix, 18
 Lawi Lewis, iii, 153; . ix, 77
 Lawi W. G. Binn. ii, 163.
 Lawleyana Bgt. ii, 145.
 Laxata Fér. iii, 109; . ix, 165
Laxata Rve. . . ix, 165
 Layardi Hartm. vii, 79; ix, 143
 Layardi Pfr. ii, 59.
 Layardi Thom. ii, 179.
 Leachii Fér. iv, 203; . ix, 330
 Leacockiana Woll. iv, 34;
 [ix, 242
 Leai Pfr. viii, 32; . ix, 229
 Leai Ward, iii, 142; . ix, 78
Lecoutii Lea, . . ix, 76
 Lecouffei L. & B. . ix, 256
 Lecta Fér. viii, 191; . ix, 277
 Lecythis Bens. ii, 87.
 Ledereri Pfr. iii, 259; . ix, 260
 Lederi Bttg. ii, 150.
 Lederi Bttg. iii, 31; . ix, 44
 Ledgbirdi Braz. viii, 107; ix, 33
 Lednicensis Branc. iv, 238;
 [ix, 319
Ledoulcia Bgt. ii, 6.
 Ledrui Mab. iv, 162; . ix, 327
 Leei Cox, vi, 251; . ix, 120
 Lefeburiana Fér. iv, 89; ix, 302
Lefeburiana Phil. . ix, 302
Legrandi Cox, ii, 269; ix, 34, 338
 Leichardti Cox, i, 123.
 Leimonias Gray, iii, 68; ix, 9
Leinardiana=*lienardiana*.
Leiocheila Alb. . . ix, 100
 Leioda Hutt. viii, 87; . ix, 28
 Leiogramma West. . ix, 256
 Leiophis Bens. iii, 163; ix, 145
Leiosoma Swains, . ix, 99, 151
 Leithiana G.-Aust. ii, 65.
 LEJEANIA Anc. . . ix, 267
 Lejeanianiana Bgt. iii, 104; ix, 268
Lejocheila Alb. . . ix, 100
 Lemesli Mab. . . ix, 256
 Lemeslei Morl. . . ix, 124
Lemniscata Brum. . ix, 319
Lemniscata Less. . . ix, 125
 Lemniscata W. & B. iv, 21;
 [ix, 258
 LEMNISCIA Lowe, . ix, 240
 Lemoinei Deb. iii, 246; ix, 252

- Lemonia Bgt. . . ix, 204
 Lemyrei Morel. i, 67.
 Lenabaria Let. . . ix, 272
 Lenelaia Mab. . . ix, 305
 Lenis Shutt. ii, 159.
 Lennepiana Pfr. ii, 71.
Lenocinia Fér. . . ix, 91
 Lenoleuca Bgt. iii, 229.
 Lenopsilius Let. ii, 158.
 Lens Fér. iii, 119; . ix, 288
 Lenta Pfr. vii, 23; . ix, 141
 Lenta Pse. . . ix, 6
 Lentiaca Sayn. viii, 190; ix, 275
 Lenticula Fér. iii, 119; ix, 288
 Lenticula Hartm. ii, 152.
Lenticula Held. . . ix, 298
 Lenticularis Mor. iii, 120; [ix, 288
 Lentiformis Kob. ii, 221.
 Lentiformis Zgl. iii, 119; ix, 288
 Lentiginosa Lwe. iv, 38; ix, 241
 Lentina Mart. . . ix, 288
Leonardi Tap.-Can. vii, 32; [ix, 141
 Leonhardti Mlldff. vi, 201; [ix, 104
 Leonina Lwe. iv, 190; ix, 293
 Leopardus Pfr. viii, 9; ix, 228
Leopoldiana Charp. ii, 189.
Lepida Poey, . . ix, 185
Lepida Reuss. . . ix, 282
 Lepidolena Bgt. . . ix, 272
 Lepidophora Bgt. . . ix, 267
 Lepidophora Dohrn, viii, [273; ix, 120
 Lepidostola Hde. iv, 55; ix, 170
 Lepidotricha Braun. . ix, 309
Lepinota West. . . ix, 275
 Leporina Gld. iii, 131; ix, 73
 Leprieurii Petit, v, 174; ix, 95
Leprosa Hde.=leprosula.
 Leprosa Shutt. iii, 223; ix, 276
 Leprosula Hde. iii, 220; ix, 204
 Leptalea Sm. viii, 95; . ix, 28
Leptarionta C. & F. . ix, 189
 Lepta West. viii, 81; . ix, 44
 LEPTAXIS Lowe, . ix, 291
 Leptocheila T.-C. vi, 296; [ix, 113
 Leptogramma Pfr. vi, 186; [ix, 136
Leptoloma Alb. . . ix, 182
 Leptomphala Bgt. . . ix, 266
 Leptosticta Lwe. iv, 37; ix, 243
 Leptostyla Dohrn, iv, 195; [ix, 294
 Leptotera M. & R. viii, 81; [ix, 41
 Lersiana Fag. . . ix, 251
 Lescaillei Gundl. v, 13; ix, 187
 Lesiniaca Fag. . . ix, 256
 Lessonii Marts. iii, 82; ix, 5
Lessoni Pfr. viii, 281; . ix, 131
Lessoni Pfr. . . ix, 134
 Lethifera C. & F. vi, 300; [ix, 156
 Letourneuxiana Bgt. iv, 12; [ix, 255
 Letranensis Pfr. v, 11; ix, 187
 Leucestha Bgt. . . ix, 251
Leucocheila West. . . ix, 325
 Leucocheilus Cox, vi, 139; [ix, 131
 Leucochilops Pils. viii, 240; [ix, 325
 LEUCOCHROA Beck, . ix, 232
 Leucodon Pfr. v, 167; ix, 95
 Leucograpta Mart. ii, 50.
 Leucoloma Stab. . . ix, 266
Leucophaea Cox, . . ix, 140
 Leucophlæa Sowb. viii, 6; ix, 228
 Leucophleæa Marts. ii, 59.
 Leucophora Bgt. . . ix, 251
 Leucophthalma Pfr. vii, 113; [ix, 226
 Leucoranea Mousson, . ix, 322
 Leucoraphe Pfr. iv, 77; ix, 58
 Leucospira Pfr. i, 168.
 Leucosticta Mts. viii, 190; [ix, 268
Leucostoma A. & R. . ix, 112
Leucostoma Risso, . . ix, 336
Leucostyla Pfr. ii, 24.
 Leucothoe Pfr. vii, 68; ix, 143

- Leucotropis* Pfr. vii, 36; ix, 141
Leucozona Zgl. iii, 171; ix, 278
LEVANTINA Kob. . ix, 332
Levesquei Berth. . ix, 336
Levettei Bld. iii, 143; . ix, 76
Levicula Bens. ii, 111.
Levieuxi Nev. iii, 77.
Levis Pfr. iii, 228; . ix, 200
Lewisii Sm. vi, 106; . ix, 214
Leytensis Beck, i, 173.
Leytensis Mlldff. . ix, 124
Leytensis Pfr. . ix, 221
LEYTIA Pilsbry, . ix, 221
Lhotaensis G.-Aust. ii, 65.
Lhotaensis Aust. ii, 101.
Liardeti Braz. ii, 181.
Libata Rve. vii, 157; . ix, 223
LIBERA Garrett, . ix, 23
Liberiæ Brown, ii, 128.
Liberta West. iii, 174.
Libertina Let. . ix, 250
Libertina West. . ix, 274
Librosa Pfr. viii, 12; . ix, 228
Liburnica Stoss. . ix, 252
Libyca Pons. viii, 185; ix, 261
Libysonis Paul. ii, 148.
Lichenifer Mörch. . ix, 231
Licodiensis Cafici, . ix, 263
Liebruti Alb. iv, 28; . ix, 263
Lienardiana Crosse, vii, 69; [ix, 143
Lieuranensis Bgt. . ix, 256
Lifouana=*lifuana*.
Lifuana Montr. i, 115; ix, 20
Ligata Müll. iv, 242; . ix, 319
Ligera Say, ii, 196.
Lightfooti Pfr. ii, 27.
Lignaria Pfr. . ix, 223
Lignaria Pfr. vii, 204; ix, 227
Lignicola Stol. . ix, 52
Lignicolor Mlldff. vii, 153; [ix, 223
Ligulata Fér. ii, 78.
Ligurica Kob. iv, 101; ix, 303
Lima Fér. v, 58; . ix, 97
Limansauensis Semp. vii, [126; ix, 220
Limara Bgt. . ix, 251
Limata G.-Aust. ii, 54.
Limatula Ward, ii, 201.
Limbata Dr. iii, 189; . ix, 271
Limbata Kryn. . ix, 304
Limbata Phil. . ix, 259
Limbifera Mart. ii, 28. .
Limbifera Mouss. ii, 218.
Limnifera Held. . ix, 278
Limula Cox, . ix, 35, 338
Linara Bgt. iii, 251.
Lincolnensis Pfr. i, 123.
Lincolnensis Pfr. vi, 144; ix, 131
Lineta Lwe. iv, 45; . ix, 243
Lindenii Pfr. . ix, 182
Lindoni Pfr. v, 45; . ix, 182
Lindstedti Pfr. ii, 21.
Lineata Oliv. . ix, 249
Lineata Say, ii, 200; . ix, 52
Lineolata Lam. . ix, 99
Lineolata Mart. . ix, 111
Lineolata Mlldff. iv, 48; ix, 205
Lineolatus Mts. i, 178.
Linguifera Lam. . ix, 77
Lingulata Fér., Dh. . ix, 73
Linnaëana Pfr. vi, 214; . ix, 105
Linophora Morel. ii, 22.
Lintschuana Kobelt, . ix, 344
Linusæ Calc. . ix, 324
Linusina Ben. . ix, 324
Liochila Mart. . ix, 100
LIOCYSTIS Mörch. iii, 75.
Liparoxantha M. & P. viii, 135.
Lirata Couth. iii, 42; . ix, 41
Lirata Pfr. ii, 215.
Liricincta Stol. ii, 53.
Liricostata M. & P. viii, 140; [ix, 39
Lirouxiana Bgt. iv, 18; ix, 257
Lisbonensis Pfr. . ix, 274
Lischkeana Kob. iii, 220; ix, 169
Lismorensis Pils. vi, 140; ix, 131
Listeri Gray, vi, 218; . ix, 108
Lithida Mab. vi, 53; . ix, 158
Lithophaga Conr. iv, 228; [ix, 333
Litoralis Brus. iv, 97; . ix, 302
Litoralis Cless. ii, 140.
Littoralis Mouss. . ix, 250

- Littoralis* Zgl. . . ix, 263
Littoricola Bens. . . ix, 37
Litturata Pfr. iv, 126 ; . ix, 322
Litturea, iv, 126 ; . ix, 322
Lituus Less. vii, 37 ; . ix, 142
Lituus Rve. . . ix, 212
Liverpoolensis Braz. vi, 141 ;
 [ix, 131
Livesayi Pfr. vi, 223 ; . ix, 108
Livida Guild. ii, 182.
Lividocincta Semp. vii, 171 ;
 [ix, 221
Lixa Blanf. ii, 102.
Lizardensis Pfr. iii, 86 ; . ix, 35
Loana Gredl. ii, 172.
Lobethana Deb. iv, 137 ; ix, 325
Locardi West. . . ix, 251
Locheana Bgt. iv, 13 ; . ix, 255
Loczyi Hilb. . . ix, 206
Lofouana Mlldff. iv, 258 ;
 [ix, 209
Loheri Mlldff. . . ix, 220
Lohrii Gabb. . . ix, 199
Loisa W. G. B., iii, 134 ; ix, 74
Lombey Pfr. . . ix, 140
Lomonti Braz. iii, 82 ; . ix, 5
Lonchostoma Mke. v, 130 ;
 [ix, 190
Longicauda Aust. ii, 98.
Longipila Mss. . . ix, 257
Longsonensis Morl. viii, 265 ;
 [ix, 104
Loocensis Hid. viii, 120 ; ix, 5
Lorcania Rossm. . . ix, 325
Loricata Gld. iii, 145 ; . ix, 76
Lorioliana Crosse, vi, 145 ;
 [ix, 131
Lorquini Pfr. vi, 286 ; . ix, 112
Loroglossicola Mab. viii, 159 ;
 [ix, 255
Lotophagorum L. & B. . ix, 251
Lottah Petterd. . . ix, 35
Loucoubeensis Cr. vi, 27 ; ix, 157
Louisiadensis Forbes, vii, 61 ;
 [ix, 142
Loveni Kr. iii, 106 ; . ix, 39
Loweana Woll. . . ix, 341
Loweii Fér. iv, 200 ; . ix, 293
Loweii P. & M. . . ix, 254
Lowi Issel. ii, 114.
Loxana Rossm. . . ix, 325
Loxensis Mill. . . ix, 94
Loxodon Pfr. v, 17 ; . ix, 186
Loxotatum Mab. vi, 13 ; ix, 290
Loxotropis Pfr. vi, 285 ; ix, 112
Lubanicus Pfr. . . ix, 104
Lubomirskii Slos. iii, 185.
Lubrica Bens. ii, 92.
Lucana Blanc. . . ix, 331
Lucana Müll. iii, 213 ; . ix, 173
Lucana Vallot. . . ix, 204
Lucani Tourn. . . ix, 294
Lucasi Dh. iv, 132 ; . ix, 324
Lucena Moq. . . ix, 182
Lucensis Paul. iv, 106 ; ix, 301
Lucens Pult. ii, 152.
Lucentumensis Bgt. . ix, 326
Lucerna Müll. v, 105 ; . ix, 89
Lucerna Swains, . . ix, 88
Lucernalis Kob. . . ix, 344
Lucernella Swains. . ix, 90
Lucetta Hutt. iii, 22 ; . ix, 32
Luehuana Auct. . . ix, 213
Lucida Drap. ii, 149.
Lucida Pult. ii, 155.
Lucidella Pfr. ii, 119.
Lucidula Swains, . . ix, 90
Luci Flor. . . ix, 249
Lucifuga Hartm. . . ix, 322
Lucilla Lwe. ii, 10.
Lucipeta Poey, v, 32 ; . ix, 185
Luckmanni Braz. ix, 34, 338
Lucorum L. iv, 239 ; . ix, 319
Luctuosa Beck, ii, 74.
Luctuosa Caf. . . ix, 249
Lucubeensis Auct. . ix, 157
Lucubrata Say, ii, 184.
Lüdersi Pfr. iii, 92 ; . ix, 6
Ludovici Alb. iv, 42 ; . ix, 243
Luengoi Hid. viii, 245 ; ix, 223
Luganensis Schintz. . ix, 301
Lugduniaca Mab. . . ix, 256
Luluana Sowb. vi, 305 ; ix, 213
Luquillensis Shutt. v, 74 ; ix, 100
LUQUILLA Crosse, . . ix, 99
Lundii Mörch, iii, 129.

- Lunula* Raf. . . ix, 76
Lunulata Kryn. . . ix, 254
Lunulata Mart. . . ix, 112
Lurida Gld. ii, 77.
Lurida Lwe. iv, 188; . ix, 240
Lurida Stud. ii, 146.
Lurida Zgl. iii, 174; . ix, 272
Luseana Paiva, iii, 31; . ix, 341
Lusitanica L. ii, 134.
Lusitanica Pfr. iii, 117; ix, 288
Lusoi Serv. . . ix, 256
Lutacea Pfr. iii, 217.
Lutea Mart. iii, 48.
Lutea Pils. viii, 267; . ix, 104
Lutea Pils. . . ix, 223
Lutea Pils. . . ix, 227
Lutea Semp. . . ix, 229
Luteata Parr. iii, 231; . ix, 249
Luteobrunnea Möll. viii, 120;
 [ix, 4
Luteocincta Semp. vii, 171;
 [ix, 221
Luteocornea Pfr. iii, 90; ix, 6
Luteofasciata D. & M. . ix, 307
Luteofasciata Lea, ii, 85.
Luteofusca Cox, vi, 144; ix, 131
Luteola Paul. . . ix, 301
Luteola Serv. . . ix, 257
Luteolina Gass. i, 120.
Lutescens D. & M. . ix, 307
Lutescens Kutsch, iv, 99.
Lutescens Ziegl. iv, 250; ix, 320
Lutosa Try. iii, 208; . ix, 206
Lutuosa Dh. viii, 212; . ix, 206
Luynesiana Bgt. . . ix, 320
Luzi Arango. v, 13; . ix, 187
Luzonica Mildff. . . ix, 209
Luzonica Mildff. . . ix, 344
Luzonica Sowb. . . ix, 222
Luzonicus Rfr. i, 174.
Luzonicus Sowb. . . ix, 230
Lybica error for libyca Pons.
 [viii, 185; ix, 261
Lychna Mab. vi, 52; . ix, 158
Lychnia Bens. ii, 50.
Lychnuchus Müll. v, 87; ix, 91
Lycica Mart. . . ix, 325
Lyelliana Lwe. iv, 41; . ix, 243
Lygæa M. & P. viii, 138; ix, 39
Lymphæus Morel. i, 183.
Lyndhurstensis Cox, ii, 169.
Lyndi Angas, vi, 183; . ix, 135
Lyra Mouss. . . ix, 48
Lyriostoma Swains, . ix, 94
LYRODISCUS Pils. . . ix, 48
Lyrostoma Swains, . ix, 94
LYRULA Woll. . . ix, 341
LYSINOE Ads. . . ix, 191
Lysistoma Shutt. . . ix, 303

Maackii Gerst. iii, 209; . ix, 204
Mabara Bgt. iii, 185.
Mabellei=mabillei.
Mabida Fag. iii, 238.
Mabillei Cr. iii, 216; . ix, 204
Macandrewiana Pfr. iii, 224;
 [ix, 336
Macarana Mhl. . . ix, 300
Macasi Higg. iv, 81; . ix, 198
Macdonaldi Cox, . ix, 35, 338
Macdougalli Iss. ii, 117.
Maceana Bgt. ii, 159.
Macfarlanei Cox, vii, 13; ix, 140
Macgillivrayi Cox, i, 171.
Macgillivrayi Forbes, vii, 55;
 [ix, 142
Macgregori Cox, iii, 127; ix, 84
Macgregori Hedl. viii, 285;
 [ix, 113
Machadoi Milne-Edw. . ix, 341
Macilenta Shuttlew. ii, 197.
Mackensiana Soul. ii, 19, 33.
Mackensii Ad. & Rv. iv, 52;
 [ix, 209
Maclayana Braz. vii, 45; ix, 142
Macleayi Cox, vi, 156; ix, 133
Macmurrayi C. B. Ad. v, 7;
 [ix, 67
Macnabiana Chitty. . ix, 58
Macneili Crosse, v, 96; . ix, 198
Maconelli Rve. vi, 76; . ix, 164
Macoyi Petterd. . . ix, 13
Macquariensis Cox, ii, 209.
Macroceramiformis Dh. ix, 171
MACROCERAS Semp. ii, 8, 107.
MACROCHLAMYS Bens. ii, 8, 87.

- MACROCYCLIS Beck. . ix, 165
 Macrocycloides Kob. iii, 219;
 [ix, 169
 MACROCYCLOIDES Mart. iii,
 [16, 48; viii, 113
 MacroGLOSSA Pfr. v, 20; ix, 186
 Macrogonus Anc. . . ix, 171
 Macromphala Bttg. . ix, 304
 Macromphalus W. Blf. iii,
 [160; ix, 146
 MACROOGONA, IX, xxxii, 148.
 Macropleuris Bens. iii, 94.
 MacroSTOMA Mhl. iv, 92; ix, 302
 MacroSTOMA Pfr. vii, 208;
 [ix, 227
 Mactanica Bgt. . . ix, 263
 MACULARIA Alb. . . ix, 331
 Macularia Lam. . . ix, 180
 Macularia Mart. . . ix, 322
 Maculata Hutt. . . ix, 12
 Maculata Mke. . . ix, 336
 Maculata Sut. viii, 96; . ix, 33
 Maculatum Raf. . . ix, 69
 Maculifera Gut. v, 35; . ix, 185
 Maculosa Born. . . ix, 335
 Maculosa Mart. . . ix, 112
 Madagascariensis Lm. vi, 32;
 [ix, 157
 Madana L. & B. . . ix, 263
 Maddocksi Braz. vii, 66; ix, 143
 Madecassina Fér. . . ix, 157
 Madera Mab. vi, 50; . ix, 156
 Maderaspata Gray, ii, 76.
 Maderensis Wood, iv, 37; ix, 243
 Madida Fag. . . ix, 257
 Madritensis Ramb. iv, 16;
 [ix, 255
 Maforensis Tap.-Can. vi, 247;
 [ix, 119
 Magdalena Anc. . . ix, 28
 Magdalenensis Stearns, viii,
 [226; ix, 199
 Magellanica Sm. iii, 42; ix, 41
 Magica Fér. . . ix, 98
 Magistra Pfr. vii, 164; . ix, 224
 Magnaciana Hde. viii, 207;
 [ix, 206
 Magna Schum. . . ix, 155
 Magnesiae Bttg. iv, 102; ix, 303
 Magnetti Cantr. viii, 236;
 [ix, 331
 Magnifica Fér. vi, 65; . ix, 153
 Magnifica Lea, . . ix, 167
 Magnificus A. & N. i, 180.
 Magtauensis Semp. vii, 125;
 [ix, 219
 Mahdarina Bgt. . . ix, 251
 Mahometana Bgt. . . ix, 319
 Maillardi Dh. ii, 106.
 Mainitensis Hid. vii, 152; ix, 223
 Maino Braz. ii, 181.
 Majellæ Kob. . . ix, 266
 Major Anc. . . ix, 20
 Major Binn. iii, 150; . ix, 77
 Major Dohrn, vi, 128; . ix, 132
 Major Mildff. . . ix, 212
 Major Pfr. ii, 29.
 Major ii, 19.
 Majoricensis D. & H. iii, 258;
 [ix, 262
 Majuscula Pfr. vi, 255; ix, 121
 Malaccana Pfr. ii, 93.
 Malacensis Anc. . . ix, 324
 Maladettæ (B.) Fag. . ix, 253
 Malantensis Ang. vii, 7; ix, 140
 Malaspinæ Bgt. iii, 180; ix, 274
 Malayana Mildff. viii, 274;
 [ix, 124
 Malbatensis Hid. . . ix, 124
 Malleata Fér, iv, 168; . ix, 327
 Malleata Q. & M. . . ix, 216
 Malinowski Zel. ii, 194.
 Malzani Kob. iv, 254; . ix, 320
 Malziaua Parr. iv, 227; ix, 333
 Mamilla Fér. vi, 212; . ix, 105
 Mamilla Lea, . . ix, 182
 Mamillaris Blanf. ii, 131.
 Mamillaris Hde. ii, 123, 170.
 Mamillata Risso, iv, 117.
 Manchesterensis Bgt. . ix, 274
 Mandarin Gray, vi, 124; ix, 214
 MANDARINA Pils. . ix, 214
 Mandralisci Biv. ii, 173.
 Manoeli Pfr. . . ix, 96
 Manriqueana Lwe. . ix, 327
 Manseli Pfr.-Cless. . ix, 96

- Mansueta* Cox, vi, 264; ix, 122
Mantinea Mab. . ix, 251
Manueli Higg. v, 166; ix, 96
Maoriana Suter, . ix, 27
Marcescens Cox, iv, 50.
 [vi, 142; ix, 131
Marchetti Stef. . ix, 265
Marchianæ Cox, iii, 265;
 [ix, 35, 338.
Marcida Gld. ii, 95.
Marcida Sh. iii, 123; ix, 289
Maresi Crosse, . ix, 325
Margarita Beck, ii, 124.
Margarita Jacq. ii, 114.
Margarita Pfr. i, 173.
Margarita Pfr. ii, 201.
Margaritacea Schm. ii, 151.
Margaritacea Semp. ii, 118.
Margaritis Pfr. vi, 297; ix, 113
Margieriana Fag. . ix, 256
Marginata Born, . ix, 93
Marginata Hutt. viii, 60;
 [ix, 9
Marginata Müll. vi, 227;
 [ix, 109
Marginata Orb. . ix, 93
Marginatoides d'Orb. . ix, 93
Marginella Gmel. v, 124; ix, 93
Marginella Pfr. . ix, 93
Marginelloides d'Orb. v,
 [126; ix, 93
Marguerittei (B.) Pch. . ix, 324
Marie Cox, . ix, 131
Mariæ Gray, iii, 37; . ix, 9
Mariannæ Kob. iv, 222; ix, 331
Mariannæ West. ii, 158.
Marianarum Q. & M. . ix, 339
Mariei Crosse, i, 113.
Mariella H. Ad. viii, 196;
 [ix, 207
Marina Hutt. viii, 57; . ix, 9
Marinduquensis Hid. vii,
 [209; ix, 228
Maristorum Flor. . ix, 251
Maritima Dr. iii, 235; . ix, 249
Maritima Pils. . ix, 77
Marmatensis Pfr. v, 191; ix, 166
Marmorata Cox, ii, 105.
Marmorata Fér. iv, 147; ix, 325
Marmorata Taylor, . ix, 307
Marmorella Pfr. iii, 46; ix, 40
Marmorellata Mab. . ix, 331
Marmorosa H. & J. iii, 90;
 [ix, 6
Maroccana Mor. iii, 120; ix, 238
Marquesana Grt. viii, 96;
 [ix, 26
Marquesana Pse. ii, 113.
Marrucina Tib. . ix, 332
Marseveni Bock, ii, 19.
Marshalli Try. ii, 101.
Marsiana Bgt. . ix, 254
Marsillyana Mab. . ix, 253
Martensiana Tib. iii, 203;
 [ix, 266
MARTENSIA Semp. ii, 6, 51.
Martensi Bttg. (radiosa var.).
Martensi Pfr. vi, 244; ix, 119
Martensi West. . ix, 266
Martigena Fér. . ix, 274
Martinatiana de Betta, . ix, 303
Martinezi Hid. ii, 175.
Martiniana Pfr. . ix, 89
Martinii Bern. v, 149; . ix, 94
Martini Pfr. ii, 33.
Martini Schepm. ix, 112.
Martorelli Bgt. iii, 179; ix, 274
Masadæ Tristr. iv, 227; ix, 333
Mascarenasi Bgt. . ix, 256
Massiei Morl. viii, 223; ix, 214
Massoni Behn. ii, 47.
Massoti Bgt. iii, 29; . ix, 338
Massylæa Morel. iv, 144; ix, 325
Mastersi Braz. viii, 294; ix, 18
Mastersi Cox, i, 170.
Mastersi Cox, vi, 133; ix, 131
Mastigeulota Pilsbry, ix, 211
Masuriensis Aust. ii, 102.
Mataianensis Nev. iv, 59; ix, 207
Mathinæ Pett. . ix, 35, 338
Mathinæ Pett. . ix, 338
Matronica Mab. . ix, 274
Matronoi Serv. . ix, 249
Matronula Uhde, . ix, 192
Matruelis Sowb. vii, 151; ix, 223
Mattarica Let. & Bgt. . ix, 326

- Mattiaca* Stein, . . . ix, 310
Matura Pfr. iii, 88; . . ix, 5
Maugeana Sh. iv, 175; . ix, 327
Maupiensis Grt. iii, 65; . ix, 26
Maupitiensis Pfr. . . ix, 26
Maura Guirao, . . . ix, 324
Mauriana Bgt. . . ix, 256
Mauriceti Bgt. ii, 158.
Mauricei Jous. = *mauritii*. [ix, 33]
Mauriniana Orb. . . ix, 342
Mauritanica Bgt. iii, 235; [ix, 249]
Mauritiana Lam. ii, 24.
Mauritiana Pfr. ii, 24.
Mauritianella Morel. ii, 25.
Mauritii Jous. v, 145; . ix, 94
Maurolici Ben. ii, 189.
Maxillata Gld. iii, 141; . ix, 78
Maxima Beck, . . . ix, 165
Maxima Bgt. . . ix, 333
Maxima Pfr. ii, 31.
Maxulana Let. & Bgt. . ix, 251
Mayeti L. & B. . . ix, 250
Maynardi Pils. viii, 241; . ix, 184
Mayrani Gass. iii, 13; . ix, 234
Mazatlanica Pfr. ii, 204; . ix, 341
Mazee Braz. vi, 165; . ix, 134
Mazenderanensis Nev. iv, [229; ix, 333]
Mazzinicola Greg. . . ix, 295
Mazzullii Jan. iv, 235; . ix, 318
Mazzulopsis Anc. viii, 238; [ix, 318]
Meadei Braz. . . ix, 135
Meander G.-A. viii, 275; . ix, 124
Medalpedensis Cl. iv, 261; [ix, 299]
Meda Porro, iv, 17; . ix, 255
Medea West. viii, 192; . ix, 277
Media Ad. v, 107; . ix, 89
Media Gmel. . . ix, 252
Medianus Cox, iii, 264; . ix, 13
Mediata West, . . ix, 304
Mediocris Pfr. ii, 166.
Mediolanensis Fag. . ix, 256
Meditata Tap.-Can. vii, 40; [ix, 142]
MEDITERRANEA Cless. ii, 143.
Megastoma Bgt. ii, 51.
Megastoma Bgt. . ix, 251
Megastoma Cox, i, 170.
Megei Lamb. i, 115.
Megerlei Jan. . . ix, 47
Mehadiæ Bgt. . . ix, 267
Mehediana L. & B. . ix, 256
Melaleucarum Gass. iii, 26; [ix, 33]
Melania Bgt. . . ix, 256
Melanocephala Gundl. v, [46; ix, 182]
Melanochila Val. vii, 150; [ix, 223]
Melanogaster Mörch. . ix, 231
Melanonixia Bgt. . ix, 320
Melanostoma Drap. iv, 246; [ix, 320]
Melanotragus Born, vi, 79, [ix, 154]
Melaspinae error for *malaspinae* Bgt.
Melbournensis Cox, iii, 35; [ix, 34]
Meleagris Pfr. iii, 81; . ix, 5
Melissophaga Costa, . ix, 319
Melitæ Gass. iii, 45; . ix, 33
Melitensis Fér. iv, 207; . ix, 330
Mellæ Pini, . . ix, 254
Mellea Pfr. vi, 97; . ix, 214
Melliniana Hagenm. . ix, 305
Mellisii Woll. ii, 176.
Mellita Hde. . . ix, 210
Mellitula Hde. . . ix, 210
Melolontha Shutt. iv, 30.
Melonii Malz. iv, 113; . ix, 305
Melosina Bgt. . . ix, 260
Melvillianæ Anc. . . ix, 340
Membranacea Jick. ii, 61.
Membranacea Lwe. iv, 201; [ix, 294]
Membranaceus Bens. i, 177.
Membranicoستا Pfr. iii, 76; [ix, 5]
Membronica Berth. . ix, 257
Menadensis Mouss. ii, 82.
Mencii Hilb. . . ix, 206
Mendana Ang. vii, 17; . ix, 140

- Mendanæ Cox, vi, 255; ix, 120
 Mendax Martens, iii, 212; [ix, 122
 Mendicaria Pfr. . ix, 274
 Mendoza Braz. vii, 21; ix, 140
Mendranoi Serv. . ix, 249
Menetriesii Kalen, . ix, 304
 Meninxica L. & B. . ix, 251
Menkeana Rve. ii, 80.
 Menkeana Pfr. iii, 108; ix, 37
 Menobana Bgt. . ix, 325
Menomphis Raf. . ix, 69
 Mensalis Hde. . ix, 210
 Mentonensis Sideb. iii, 229.
 Mentonica Nev. ii, 146.
 Mentonica Nevill. . ix, 322
 Menzelensis Let. & Bgt. ix, 251
 Meobambensis Pfr. v, 144; [ix, 94
 Merarcha Mab. vi, 235; ix, 107
 Mera Rve. iii, 94; . ix, 170
 Mercatoria Gray, vi, 121; [ix, 214
Mercatorina Mab. vi, 121; [ix, 107
 Mercedesi Serv. . ix, 256
 Mercurius Pfr. viii, 50; ix, 231
Meretrix Sowb. . ix, 109
 Merguensis Phil. . ix, 116
 Meridionalis Braz. vi, 161; [ix, 134
 Meridionalis Iss. . ix, 44
 Meridionalis Mlldff. . ix, 204
 Meridionalis Mlldff. . ix, 220
 Meridionalis Parr. iv, 9; ix, 255
 Meridionalis Paul. ii, 191.
Meridionalis Risso, . ix, 264
 Meridionalis Sm. vii, 77; ix, 143
Meridionalis Wood, ii, 30.
 Merita Mouss. iv, 185; ix, 328
Merope Alb. . ix, 137
 Mersipira Mart. vi, 298; ix, 113
 Merziana Pfr. iii, 89; . ix, 5
 Merzianoides Garr. viii, 132; [ix, 6
 Mesembrica Let. & Bgt. ix, 251
Mesodon Raf. . ix, 69
 MESODONTOPSIS Pilsbry, ix, 310
 Mesoleuca Mts. . ix, 274
 Mesomphalos Mor. . ix, 198
 MESOMPHIX Raf. ii, 12, 196.
Mesopotamica Mouss. ix, 249 250
 Mesostena West. viii, 175; [ix, 255
 Mesostoma Westerl. iii, 238.
 Messanensis Suliotti, . ix, 331
 Messapia Blanc. iv, 19.
 Messenica Bl. & W. . ix, 272
 Metabola West, . ix, 255
 METACAMPYLÆA Pils. . ix, 310
 Metaformis Fér. vii, 186; ix, 225
 METAFRUTICICOLA Iher. ix, 276
 Meta Pfr. vii, 17; . ix, 140
 Metcalfei Pfr. viii, 121; ix, 4
 Meteora Bgt. . ix, 251
 Meticulosa Let. & Bgt. . ix, 251
 METODONTIA Mlldff. . ix, 279
Metonomastica Cr. & Fisch. [ii, 186.
Metula Crosse, . ix, 140
 Meyeri Strub. . ix, 342
 Mezessaria Let. & Bgt. . ix, 251
 Miara Mab. vi, 270; . ix, 124
 Micacea Hde. iii, 221; . ix, 170
 Mica Morel. ii, 107.
 Micans Ang. ii, 182.
 Micans Pfr. vii, 128; . ix, 221
 Miccyla Bens. ii, 176; . ix, 52
Michaudiana Rm. . ix, 302
 Michaudii Dh. iv, 21; . ix, 240
 Micholitzi Mlldff. viii, 272; [ix, 122
 Michoniana Bgt. iv, 229; ix, 333
 Micra Morel. ii, 176.
 MICRARIONTA Ancey, ix, 197
 Microconus Mouss. ii, 215.
 MICROCONUS Str. & Pfr. ix, 340
 Microcosmos Cox, ii, 179; ix, 340
 Microcyclus Bttg. viii, 113.
 MICROCYSTINA Meh. ii, 9, 124.
 MICROCYSTIS Beck, ii, 8, 112.
 Microdiscus Reinh. ii, 142.
 Microdonta Desh. . ix, 73
Microdonta Dh. . ix, 150
Microdonta W. G. B. . ix, 73
 Microforis Dall, iii, 138; ix, 73

- Microgyra* Bgt. . ix, 275
Microgyra Hde. ii, 122.
Micromphala Lwe. iv, 37; [ix, 243
Micromphalus Let. . ix, 257
Micromphalus Pils. vi, 247; [ix, 119
Micropetasus Mlldff. . ix, 279
Microphana Bgt. . ix, 256
Microphis Crosse, i, 114; ix, 84
Microphysa Martens, . ix, 54
Microphyura Anc. . ix, 84
Micropleuros Pag. iii, 28; [ix, 45
Micropristis Anc. . ix, 260
Microreticulata Sut. viii, [63; ix, 9
Microscopica Cox, not Kr. ii, [179; ix, 33
Microscopica Kr. iii, 106; [ix, 38
Microsoma Morel. ii, 176.
Microspila Bgt. . ix, 250
Microspira Pfr. vii, 145; ix, 222
Microstigmæa Silv. . ix, 45
Microstoma Lm. . ix, 97
Microtrochus Mlldff. . ix, 170
Microtrochus Möll. viii, 201; [ix, 170
Microtrochus Mörch. ii, 126.
Microundulata Sut. viii, 89; [ix, 28
Micula Mouss. ii, 61.
Middendorffi Gerst. iv, 111; [ix, 204
Midsoni Brazier, . ix, 34
Mighelsiana Pfr. iii, 212; [ix, 204
Migratoria Pfr. vii, 22; ix, 140
Miguelina Pfr. ii, 159.
Milasehwitschi Ret. . ix, 260
Milettiana Paul. iv, 220; ix, 332
Miliacea Mart. iv, 49.
Miliaria Gredl. . ix, 204
Militaris Pfr. . ix, 150
Milium Mart. iv, 49.
Milium Morse. ii, 203.
Millepunctata Bttg. viii, 178; [ix, 249
Millepunctata Smith, . ix, 343
Millieri Dohrn, . ix, 294
Millieri Pfr. v, 25; . ix, 184
Millestriata Smith, i, 130; [ix, 33
Millicentræ Cox, vii, 62; ix, 142
Millieri Bgt. viii, 228; . ix, 303
Milligani Braz. . ix, 13
Milligani Pfr. i, 172.
Miloni (B.) Péch. . ix, 326
Mima West. . ix, 234
Mimicula Hde. . ix, 204
Mimosa Pett. . ix, 34
Mimula Mlldff. . ix, 170
Mina Pfr. v, 125; . ix, 93
Mindaiensis Bock, ii, 19.
Mindanaensis Semp. ii, 31.
Mindanaensis Sby. vii, 148; [ix, 223
Mindana Rve. . ix, 223
Mindorana Hartm. . ix, 223
Mindoroensis Brod. viii, 52; [ix, 231
Minensis Mlldff. ii, 121.
Mingrellica Mouss. ii, 192.
Minima H. Ad. ii, 106.
Minor vi, 126; . ix, 132
Minor Bgt. . ix, 259
Minor Bttg. viii, 261; . ix, 173
Minor C. & F. vi, 302; ix, 156
Minor Fér. . ix, 119
Minor Kob. iv, 261; . ix, 335
Minor Malz. iv, 211; . ix, 330
Minor Mlldff. . ix, 224
Minor Musson, . ix, 159
Minor W. G. B. . ix, 199
Minorica Berth. . ix, 325
Minoricensis Mitt. iv, 148; [ix, 325
Minura West. ii, 145.
Minuscula Binn. ii, 202.
Minutalis Morel. ii, 202.
Minuta Aust. ii, 112.
Minuta Say, . ix, 283
Minuta Villa, ii, 158.
Minutissima Sm. viii, 94; ix, 28
Minutissimum Lea, . ix, 8
Minutula Crosse, ii, 119; ix, 20
Minutus G.-A. i, 182; ii, 112.

- Minviellei* Ph. . . . ix, 41
Minythodes M. & P. viii, [144; ix, 38
Mionecton Bttg. viii, 260; [ix, 284
Mirabilis Fér. vii, 181; ix, 224
Miranda Ad. vi, 104; ix, 214
Mirandæ Lwe. iv, 26; ix, 261
Mirandæ Ramb. . . ix, 254
Miranda Hutt. viii, 68; ix, 15
Misara B. . . ix, 257
Miscella West. . . ix, 262
Misella Fér. ii, 115.
Miser Cox, vii, 20; . ix, 140
Mista West. . . ix, 260
Mitanensis G.-A. viii, 195; [ix, 209
Mitchellæ Cox, vi, 154; ix, 133
Mitchelliana Lea, iii, 151; ix, 77
Mitidjana Anc. . . ix, 260
Mitigata Mouss. . . ix, 258
Mitis Pfr. ii, 171.
Mitiusecula Mart. ii, 97.
Mitra Alb. . . ix, 291
Mixta Cox, iii, 261.
Mnenia West. . . ix, 266
Moabitica Goldfuss, . ix, 320
Mobiliana Lea, . . ix, 77
Moderata Mouss. iv, 26; ix, 261
Modesta Fér. iv, 167; ix, 327
Modesta Moq. iv, 92; . ix, 303
Modesta Parr. . . ix, 266, 278
Modesta Sowb. viii, 35; ix, 230
Modica Morel. iii, 236; ix, 255
Modicella Fér. iii, 38; . ix, 35
MOELLENDORFFIA Anc. ix, 289
Moerchiana Aust. ii, 125.
Moesta Parr. iii, 233; . ix, 249
Mogadorensis Bgt. iv, 22; ix, 261
Mograbina Mor. iv, 22; ix, 261
Mola Hde. . . ix, 204
Molecula Bens. ii, 103.
Molinæ Hid. iv, 15; . ix, 255
Molina Hde. . . ix, 287
MOLLENDORFFIA Anc. ix, 289
Möllendorffi Hid. . . ix, 228
Möllendorffi Kob. iv, 95; ix, 302
Möllendorffi Reinh. ii, 123.
Mollerati Morel. . . ix, 301
Molliseta Pfr. vi, 246; . ix, 119
Moltenii Ad. . . ix, 331
Moltneri Gredl. . . ix, 279
Moluccensis Pfr. . . ix, 113
MONACHA Fitz. . . ix, 271
Monacha Mab. vi, 47; . ix, 157
Monacha Pfr. vi, 133; . ix, 131
MONADENIA Pils. . . ix, 198
Monaecensis Ramb. . ix, 322
Monas Morel. iii, 54; . ix, 281
Monerea Bgt. . . ix, 251
Monerebia Mab. . . ix, 266
Moneriana Bgt. viii, 165; ix, 249
Mongolica Mlldff. viii, 206; [ix, 206
Mongrandiana Bgt. . ix, 274
MONILEARIA Mouss. . ix, 257
Monile Brod. v, 192; . ix, 167
Monilifera W. & B. iv, 20; [ix, 258
Monistrolensis Fag. . ix, 256
Moniziana Paiva, iv, 34; ix, 245
Monochoera Sowb. vi, 208; [ix, 104
Monodon Fér. . . ix, 278
Monodon Rack. iii, 142; ix, 78
Monodon Villa, iii, 188; ix, 272
Monodonta Grat. ii, 27.
Monodonta Lea, v, 21; ix, 186
Monographa Dör. . ix, 198
Monolacca Pfr. v, 182; ix, 166
Monomena Bens. ii, 57.
MONOMPHALUS Ancey, ix, 19
Monozonalis Lam. ii, 76.
Monozonata Poll. . ix, 303
Monozona Z. . . ix, 300
Monozonus Pfr. . . ix, 227
Monstrosa Anc. viii, 82; ix, 35
Montana Paul. iv, 107; ix, 301
Montana Stud. . . ix, 322
Montana Semp. vii, 191; ix, 225
Montana Sterki. . . ix, 283
Montana Stud. iii, 175; ix, 274
Montana Sut. . . ix, 32
Montandoni Cless. iii, 251.
Montalivetensis Smith, ix, 343
Montenegrina Zgl. iv, 88; ix, 300

- Montetaurina Pfr. iii, 97; ix, 58
 Montfortiana Pfr. vii, 165; [ix, 224
 Montgiscardiana Fag. . ix, 256
 Monticola Bens. i, 176.
 Monticola Hutt. ii, 107.
Monticola Mlldff. ii, 67.
 Monticula Sowb. vii, 176; [ix, 225
 Montigena Hagen. . ix, 305
Montium Mts. . ix, 214
 Montivaga Fag. . ix, 257
 Montivaga Sut. . ix, 339
 Montivaga West. . ix, 274
 Montrouzieri Souv. i, 113.
 Montserratensis Hid. iii, 257; [ix, 260
 Mooreana Grt. ii, 119.
 Mooreana W. G. B. iii, 135; [ix, 74
 Moqueroni Bgt. iv, 18.
 Moquiniana Raym. iii, 181; [ix, 274
Mora Gray, . ix, 89
 Moraguesi Kob. iii, 255; ix, 260
 Morata Mouss. iv, 43; . ix, 260
 Morbida Morel. v, 35; . ix, 184
 Morbihana Bgt. . ix, 252
 Morbosoalbina Rossm. . ix, 307
Morchia Alb. ii, 13, 208.
 Mörchiana Aust. ii, 125.
 Mörchii Pfr. ii, 85.
 Mörchii West. . ix, 274
 Mordax Shutt. iii, 57; . ix, 50
 MORELETIA Gray, ii, 11, 185.
 Moreletiana Hde. vi, 110; [ix, 214
 Moreleti Pfr. vii, 165; . ix, 224
 Moreri Fag. . ix, 257
 Moresbyi Ang. vi, 160; ix, 134
 Moretonensis Pfr. iii, 86.
Moricandi Beck, . ix, 167
 Moricandi Sowb. vi, 222; ix, 108
 Moricola Pal. iv, 13; . ix, 255
 Morini Bgt. . ix, 260
 Morio Canefri, viii, 128; ix, 5
Morlachica Parr. ii, 135.
 Morleti D. & H. vi, 240; ix, 107
 Mormonum Pfr. iv, 70; ix, 199
 Morongensis Mlldff. viii, 270; [ix, 108
 Morongensis Mlldff. . ix, 337
Morosa Morel. vi, 134; ix, 131
 Morosula Gass. . ix, 33
 Morsei Dall, iii, 139.
Morsei Tryon, ii, 162.
Mortella Serv. ii, 143.
 Mortella Serv. . ix, 273
Morti Cox, iii, 34; . ix, 34
Mortilleti Pecchio, ii, 154.
Mortoni Jeffr. ii, 173.
Morula Hid. . ix, 94
 Moseleyi Smith, vii, 72; ix, 143
 Mosellica Bgt. . ix, 204
 Mossmani Braz. vi, 152; ix, 133
 Motacilla Pfr. vii, 66; . ix, 142
 Mouensis Cr. iii, 95; . ix, 53
Mouhoti Reeve, ii, 18.
 Monhoti Pfr. ii, 85, 86.
Moulinsii P. & M. . ix, 301
 Moupiniana Dh. ii, 103; ix, 205
 Mouqueroni Bgt., Loc. . ix, 226
 Mourilyana Braz. vi, 172; [ix, 134
 Mouroi Serv. iii, 229.
 Moussoniana ii, 43.
 Moussoniana Marts. . ix, 209
 Moussoniana Woll. iv, 145; [ix, 325
 Moussoni Kob. ii, 195.
 Moussoni Pfr. ii, 72.
Moussoni Semp. ii, 44.
 Moussoni Sut. viii, 105; ix, 32
 Moutoni Mitt. iii, 186; ix, 275
 Moyobambensis Moric. i, 65.
 Mozambicensis Pfr. ii, 50.
 Mucida Pfr. vi, 148; . ix, 122
 Mucoides Ten.-Woods, iii, [44; ix, 34
Mucosa Blanf. ii, 87.
 Mucronata Mlldff. viii, 198; [ix, 280
Mucronata Pfr. ii, 27.
 Muggianica Stoss. . ix, 256
 Mühlfeldtiana Pfr. vi, 15; [ix, 159

- Nana* Hutt. ii, 64.
Nana Jeffer. iii, 173; . ix, 274
Nana Mlldff. iii, 158; . ix, 146
Nana Mlldff. . ix, 342
Nana Mouss. . ix, 333
Nana Semp. vii, 155; . ix, 220
Nana Wagn. i, 64.
NANINA Gray, ii, 4, 15.
Naninoides Bens. ii, 79.
Nannodonta A. D. Br. v, 103.
Nansoutyana Bgt. . ix, 257
Napensis Crosse, v, 188; ix, 166
Narbonensis Cless. ii, 140.
Narbonensis Req. . ix, 255
Narentina Klec. iv, 99; ix, 301
Narzanensis Krynn. iv, 84; [ix, 304
Naso Mart. vii, 56; ix, 142
Nasuta Metc. ii, 21.
Natalensis Pfr. iii, 103.
NATALINA Pils. viii, 135.
Naticoides Drap. . ix, 318
Natolica Alb. ii, 194.
Natunensis Smith, . ix, 337
Naudieri Bgt. . ix, 251
Naujanica Hid. viii, 268; [ix, 104
Nautarum Hde. iii, 183; ix, 275
Nautica Loc. . ix, 251
Nautiliformis Porro. iii, 114; [ix, 287
NAUTILINUS Mss. ii, 11, 172.
Nautiloidea Cox, . ix, 34
Nautiloides Val. iii, 212; ix, 124
Nautinica Mab. iii, 251.
Navarrica Bgt. ii, 150.
Navigatorum Pfr. iii, 90; ix, 6
Naxiana Fér. iv, 115; ix, 277
Nazarensis Mouss. . ix, 234
Nazarina (B.) Serv. . ix, 307
Neapolitana Paul. iv, 91; ix, 301
Nebrodensis Prj. iv, 220; ix, 332
Nebulata Mke. . ix, 274
Nebulosa Blanf. ii, 97.
Nebulosa Pfr. viii, 29; ix, 229
Neftana Bgt. . ix, 250
Neglecta Braz. iii, 87; . ix, 34
Neglecta Drap. iii, 243; ix, 252
Neglecta Pils. viii, 124; ix, 4
Neherensis Bens. iii, 33.
Nelsonensis Braz. ii, 169.
Nematophora Pfr. ii, 114.
Nemesiana Bgt. iii, 31; ix, 45
Nemetuna Bgt. . ix, 267
Nemoralina Pet. v, 22; ix, 186
Nemoralis Müll. ii, 71.
Nemoralis Linn. iv, 122; ix, 322
Nemoraloides Ad. v, 40; ix, 183
Nemoraloides Kob. . ix, 322
Nemoraloides Martens, ix, 322
Nemorensis Müll. ii, 71.
Nengloensis Aust. ii, 98.
NEOCEPOLIS Pils. . ix, 106
Neogranadensis Pfr. v, 153; [ix, 94
Neohelix Ihering, . ix, 69
Neopolitana Andr. . ix, 252
Neozelanica Auct. . ix, 30
Neozelanica Hutt. . ix, 13
Nepeanensis Braz. ii, 181.
Nephæca Fag. . ix, 253
Nepos Pfr. ii, 89.
Neptunus Pfr. ii, 34.
Nerissa Hutt. . ix, 9
Neritoides Ch. . ix, 318
NESOPHILA Pilsbry, . ix, 27
Neuwardii DeHaan. ii, 71.
Nevesiana Silv. . ix, 274
Nevilli Ad. ii, 25.
Nevilliana Paul. ii, 148.
Nevilli G.-Aust. ii, 65.
Nevisensis Pils. v, 89; ix, 91
Newberryanum Binn. iii, [110; ix, 193
Newcombiana Poey, ix, 184
Newcombi Hemph. viii, 115; [ix, 50
Newcombi Pfr. i, 171.
Newka Dohrn, iv, 29; ix, 262
Newkopsis L. & B. . ix, 262
Newtoni Nev. iii, 27; . ix, 38
Niahensis G.-A. vii, 85; ix, 170
Nicaensis Risso. . ix, 331
Nicaisiana Let. . ix, 272
Nicatis Costa iv, 101; . ix, 302
Niciensis Fér. iv, 214; ix, 331

- Nickliniana* Lea. iv, 73 ; ix, 199
Nicobarica Chemn. ii, 15.
Nicolai Klec. iv, 98 ; . ix, 301
Nicolisiana Ad. viii, 227 ; ix, 303
Nicolsonianum Montf. . ix, 180
Nicomede Braz. vi, 173 ; ix, 134
Nicosiana Mss. iii, 189 ; ix, 272
Niger Quoy, i, 169.
Nigrans Sm. viii, 128 ; . ix, 5
Nigrescens Kobelt, . ix, 344
Nigrescens Locard, . ix, 307
Nigrescens Semp. . ix, 229
Nigrescens Wood, v, 91 ; ix, 91
Nigricans Mlldff. . ix, 224
Nigrilabris v. Mts. vi, 179 ;
 [ix, 135
Nigritella Martens, . ix, 1
Nigritella Pfr. iii, 78 ; . ix, 6
Nigrocincta Semp. viii, 50 ;
 [ix, 231
Nigrofasciata Pfr. vii, 71 ;
 [ix, 143
Nigrolabiata Mlldff. . ix, 225
Nigropicta Arango, v, 47 ;
 [ix, 182
Nigropurpurea C. & F. vi,
 [302 ; ix, 156
Nigrozonata Bgt. . ix, 319
Nikitai Cless. iii, 251.
Nilagirica Pfr. iv, 65 ; . ix, 116
Nilotica Bgt. iv, 249 ; . ix, 320
Nimbosa Brod. viii, 21 ; ix, 228
Nimbosa Cr. vi, 101 ; . ix, 214
Nilssoniana Bk. . ix, 255
Ningpoensis Bttg. viii, 194 ;
 [ix, 209
Niniivita Gall. viii, 238 ; ix, 333
Niphas Pfr. iv, 196 ; . ix, 293
Nipponensis Kob. . ix, 214
Nisoria Rm. iv, 104 ; . ix, 302
Nitefacta Bgt. . ix, 326
Nitella Morel. ii, 106.
Nitellina Bgt. ii, 195.
Nitens Alten, ii, 149.
Nitens Mat. & Rack, ii, 155.
Nitens Mich. ii, 150.
Nitens Shepp. ii, 145.
Nitensoides d'Orb. ii, 164.
Nitescens Andr. ii, 171.
Nitida Drap. ii, 149.
Nitida Müll. ii, 171.
Nitida Risso, ii, 150.
Nitidissima Baud. ii, 138.
Nitidissima Mlldff. ii, 104.
Nitidissima Smith, ii, 111.
Nitidiuscula Bttg. viii, 284 ;
 [ix, 112
Nitidiuscula Sowb. iv, 188 ;
 [ix, 240
Nitidopsis Morel. ii, 166.
Nitidosa Fér. ii, 153.
Nitidula Alten. ii, 173.
Nitidula Drap. ii, 152.
Nitidula Stud. . ix, 283
Nitidulus Dohrn. i, 66.
Nivalis Ménétr. . ix, 304
Nivariæ Woll. iv, 169 ; . ix, 327
Nivariensis Sh., Rve. . ix, 258
Nivea Gmel. undet. *Helicella*.
Nivea Zgl. . ix, 268
Nivellina Bgt. . ix, 268
Nivosa Sowb. iv, 190 ; . ix, 293
Nobilis C. B. Ad. v, 103 ;
 [ix, 89
Nobilis Pfr. ii, 37.
Nobilis Rve. ii, 36.
Nobilis Rve. . ix, 228
Noctuabunda Bgt. ii, 145.
Noctuella Bgt. . ix, 257
Nodifera Pfr. vii, 37 ; . ix, 141
Nodosostriata Mouss. . ix, 261
Nodosum Raf. . ix, 69
Nodulata Mouss. ii, 124.
Nomechosi Let. iii, 250.
Nomephila Bgt. . ix, 256
Nongsteinensis G.-A. ii, 66.
Nora H. Ad. . ix, 205
Nordenskiöldi West. iii, 201 ;
 [ix, 274
Nordmanni Parr. iv, 251 ;
 [ix, 320
Normalis Martens, . ix, 150
Normalis Pse. ii, 116.
Norodomiana Morl. vi, 270 ;
 [ix, 124
Norrisii Sowb. vii, 143 ; ix, 223

- Nortoni Braz. . . ix, 142
 Norvegica Esm. ii, 172.
 Noscibilis Fér. v, 63; . ix, 97
 Nossibeensis Bttg. vi, 40; [ix, 157
Notabilis Fér. . . ix, 97
Notata Dh. . . ix, 77
Notata Poey, . . ix, 74
 Nouleti LeGuill. ii, 77.
 Noumeensis Crosse, ii, 167; [ix, 33
 Nova Bgt. . . ix, 256
 Nova Paul. . . ix, 263
 Novacula Mart. vi, 33; ix, 157
 Novægeorgiensis Cox, vii, [72; ix, 143
 Novæhiberniæ Q. ii, 39.
 Novæhollandiæ Gray, vi, 91; [ix, 129
 Novaræ Pfr. . . ix, 18
 Novella Pfr. ii, 41.
 Noverca Friv. iv, 115; ix, 277
 Novoguineensis Pfr. vii, 42; [ix, 142
 Novoseelandica Pfr. ix, 30
 Nubeculata Desh. v, 191; ix, 166
 Nubigena Charp. vi, 84; ix, 252
Nubigena Lowe, iii, 223.
Nubila Charp. . . ix, 252
 Nubila Zgl. iv. 106. . ix, 302
 Nucleatus Stol. i, 177.
 Nucleola Rang, v, 82; . ix, 91
 Nucleus Dh. iii, 207; . ix, 204
 Nucula Parr. iv, 247; . ix, 320
 Nuda Pfr. ii, 88.
 Nudata West. . . ix, 273
 Nullarborica Tate, vi, 181; [ix, 131
Numidia Issel. . . ix, 258
 Numidica Moq. iv, 24; ix, 263
 Nummuliformis Ret. . ix, 260
Nummulina Kob. . ix, 268
 Nummus Ehr. iii, 199; ix, 268
 Nummus Issel. iii, 82; ix, 5
Nupera Brazier, ii, 210; ix, 34
 Nupta West. . . ix, 320
Nuttalliana Lea. . . ix, 199
Nuxdenticulata Chemn. v, 82; [ix, 91
 Nux Mildff. vi, 307; . ix, 214
 Nux Semp. viii, 5; . ix, 228
 Nya Let. . . ix, 251
 Nyassana Smith, ii, 128.
 Nyelii Mitt. iii, 258; . ix, 260
 Nympha Pfr. . . ix, 220
 Nympha Pfr. viii, 23; . ix, 228
 Nymphæa Dub. . . ix, 304
 Nystiana Pfr. . . ix, 199
 Oajacensis Koch. iii, 50; ix, 199
 OBBA Beck, . . ix, 107
Obba Martens, . . ix, 105
Obbina Semp. . . ix, 107
 OBBINULA Stache, . ix, 295
 Obconica Pse. ii, 49.
 OBELUS Hartmann, . ix, 261
 Oberndoerferi Kob. iv, 217; [ix, 331
 Oberthuri Anc. . . ix, 256
 Obesa Beck, v, 83; . ix, 91
 Obesior Mart. ii, 91.
 Obliquata Dh. vii, 116; ix, 221
 Obliquata Mart. . . ix, 112
 Obliquata Rve. ii, 76.
 Obliquerugosa Smith, . ix, 343
 Oblita Pfr. ii, 98.
 Obliterata Fér. v, 69; . ix, 99
Obliterata Hartm. . ix, 252
 Oblonga Sowb. viii, 269; ix, 104
 Obnubila Rve. i, 120; . ix, 13
 Obolus Gld. iii, 61; . ix, 25
 Obruta Morel. iv, 6; . ix, 255
 Obscura C. & F. vi, 302; ix, 156
Obscura C. & F. . . ix, 190
 Obscura Dh. iii, 206; . ix, 205
 Obscura Mildff. vi, 230; ix, 109
 Obscura Mouss. . . ix, 272
 Obscura Pils. . . ix, 199
 Obscurata A. & R. iii, 48.
 Obscurata Porro, ii, 190.
Obscurata Rossm. ii, 190.
 Obserata Lwe. iv, 40; . ix, 241
Obsita Pfr. . . ix, 199
 Obsoleta Pils. . . ix, 76

- Obstricta Say, iii, 148; ix, 77
 Obstructa Fér. iii, 196; ix, 266
Obstructa Hde. not Fér. ix, 279
Obstrusa Fér. . . ix, 266
 Obtecta Lwe. iv, 35; . ix, 241
 Obtecta Reinh. vi, 362; ix, 120
Obtecta West. . . ix, 272
Obtusalis Mouss. . ix, 320
 Obtusa Pfr. vii, 132; . ix, 222
 Obtusa West. ii, 171.
 Obtusangula Pfr. ii, 114.
 Obtusangula Reinh. ii, 178.
Obtusata Ziegl. . . ix, 320
Obversa Born. . . ix, 330
 Obvia Mke. . . ix, 252
 Obvoluta Müll. iii, 115; ix, 287
Ocampi Streb. iv, 76; . ix, 68
 Occidentalis Recl. iii, 180; [ix, 274
 Ocellusa Gass. i, 122; . ix, 54
 Ocellusa Mouss. . . ix, 333
 Oconella Let. & Bgt. . ix, 251
Ocelluta Biv. . . ix, 266
 Occulta Pfr. vi, 266; . ix, 122
 Occultata Paul. . . ix, 302
 Occultus Cox, iii, 264; ix, 10
 Oceanica Le Guill. iii, 46.
 Ocellata Parr. iii, 191.
Ocellus Villa. . . ix, 252
Ochracea Zieg. . . ix, 266
 Ochsenii Phil. ii, 166.
Ochtheiphila Beck, . ix, 243
Ochtheiphila Orb. i, 64.
 Ochthoplax Bens. vi, 202; [ix, 104
 Oconnellensis Cox, vi, 158; [ix, 134
Oeskayi Stentz. . . ix, 288
 Octinella Bgt. viii, 55; ix, 234
 Octogyrata Mouss. iii, 118; [ix, 288
 Octolamellata Grt. viii, 95; [ix, 26
Oculatus Montf. . . ix, 93
Oculuscapri Müll. ii, 134.
 Oculus Pfr. iv, 59; . ix, 210
 Odarsensis Fag. . . ix, 256
 Odeca Bgt. . . ix, 271
Odomphium Raf. . . ix, 69
 Odontina Morel. ii, 27.
Odontognatha Mörch. ix, xxiii.
 Odontophora Bens. iii, 157; [ix, 148
 ODONTOSAGDA Martens, ix, 64
Odontura F. & C. . . ix, 191
 Odopachya Bgt. iv, 140; ix, 325
Odotropis Raf. . . ix, 69
Oecoscia Bgt. ii, 143.
 Oecoscia Bgt. . . ix, 275
 Oedesima Nev. . . ix, 322
 Oelandica West. . . ix, 307
 Oenostoma Dh. viii, 223; [ix, 204
Oenostoma Lwe. . . ix, 293
 Oertzeni Malz. iii, 229.
 Oetæa Mart. . . ix, 303
 Oetæ Kob. iv, 143; . ix, 326
 Officierii Cox, iii, 266; . ix, 34
 Ogiaca Serv. . . ix, 250
 Oglei G.-Aust. iii, 159; ix, 146
 Ogygiaca West. . . ix, 263
 Okeniana Pfr. v, 110; . ix, 90
 Oldhami Bens. iv, 61; . ix, 209
 Oleacea Sh. iv, 20; . ix, 258
 Oleacina Semp. iii, 77; ix, 6
 Olearis West. ii, 158.
 Oleosa Pfr. ii, 127.
 OLIGOSPIRA Anc. . . ix, 154
 Olisippensis Serv. . . ix, 256
 Olivacea Bttg. . . ix, 304
 Olivacea Mlldff. . . ix, 228
 Olivacea Pils. vi, 300; . ix, 156
 Olivacea Sut. viii, 75; . ix, 18
 Olivaresi Serv. iii, 229.
 Olivetorum Herm. ii, 188.
Olivaria Iss. . . ix, 265
Olivieri C. Pfr. . . ix, 266
Olivieri Fér. iii, 191; . ix, 266
Olneyæ Pils. . . ix, 76
 Oltisiana Fagot. ii, 172.
 Olympica Roth. iv, 101; ix, 303
 Omalisma Bgt. . . ix, 47
 Omalomorpha Orb. i, 64.
Omega Pfr. . . ix, 18
Omicron Pfr. i, 115; . ix, 34
 Omissa Pfr. ii, 175.

- Omoia Mab. vi, 46; . ix, 157
 OMPHALINA Raf. ii, 11, 183.
 Omphalion Bens. iii, 108; [viii, 135
 Omphalodes Pfr. vi, 26; ix, 157
 Omphalophora Dut. . ix, 305
Oncopila error for *uncopila* Hde.
 Oneataensis Mouss. ii, 119.
 Onixiomiera Bgt. iv, 240; ix, 319
Onslowi Braz. . ix, 34
Onychina Rm. . ix, 267
 Onyx Brod. vii, 199; . ix, 227
 Oomorpha Mab. vi, 49; ix, 153
 Oomorpha Sowb. viii, 269; [ix, 104
 Opaca Mart. ii, 73.
Opaca Shuttlew. ii, 148.
 Opalina Ad. ii, 201.
 Opalina Sowb. viii, 42; ix, 230
 Opanica Ant. iii, 67; . ix, 26
 Opaoana (Rhytida) Gass. iii, 45.
Oparana Beck, . ix, 23
Oparica Auct. iii, 67; . ix, 26
 Ophelia Pfr. ii, 211; . ix, 16
Ophidermis Agas. . ix, 166
Ophioderms Herm. . ix, 166
Ophiogyra Alb. . ix, 81
Ophiospila Anc. . ix, 166
 Ophiria Pfr. i, 128.
 Opiparus Aust. ii, 101.
 Oppenheimi Greg. . ix, 295
 Oppidi Fag. . ix, 257
 Oppilata Morel. iii, 133; ix, 74
 Opposita Mouss. iv, 257.
 Oppressa Pse. iii, 78; . ix, 6
 Oppressa Shuttlew. ii, 148.
 Opulens West. iii, 20; . ix, 47
Oquirrhensis Hemph. . ix, 50
 Oranensis Morl. iii, 249; ix, 249
Oranica Bgt. . ix, 324
Orata Let. ii, 145.
Orbicula Hutt. not Orb. ix, 209
Orbicula Orb. i, 251.
 Orbiculata Fér. v, 86; . ix, 91
Orbiculata Wood. . ix, 327
 Orbiculum Tap.-Can. ii, 219.
 Orbigny W. & B. iii, 237; [ix, 258
 Orbis Beck, ii, 114.
 Orbitula Sowb. vii, 179; ix, 225
 Orcella Stol. . ix, 52
 Orcula Bens. ii, 177; . ix, 52
 Ordinaria Smith, ii, 164; ix, 41
 Ordunensis Kob. viii, 161; [ix, 255
 Oreas Koch, v, 136; . ix, 94
 Oregonensis Hemph. . ix, 76
Oregonensis Lea, . ix, 199
 Oreina Fag. . ix, 257
 OREOBBA Pilsbry, . ix, 109
 Oresigena Orb. . ix, 198
 Oreta Bgt. . ix, 251
Orgonensis Philb. . ix, 331
 Originaria Aust. ii, 100.
 Orites Westerl. . ix, 331
 Oriunda Gass. i, 121; . ix, 54
 Ornata Parr. . ix, 301
 Ornatella Beck, ii, 115.
Ornatella Pfr. ii, 112.
 Ornatissima Bens. ii, 95.
Orobia Alb. ii, 8.
 Orobia Bens. ii, 108.
Orobæna Anc. . ix, 76
 Orophea West. . ix, 260
Orotavana Tarnier, . ix, 258
 Orphana Hde. . ix, 44
 Orphea West. . ix, 260
 ORPIELLA Gray, ii, 7, 68.
 Orsinii (Porro) Villa, iii, [203; ix, 266
 Orta Paul. iv, 224; . ix, 332
Orthocheilis Hde. . ix, 209
 Orthostoma Pfr. ii, 47.
 ORTHOSTYLUS Beck, . ix, 227
 Ortoni Crosse, iii, 127; . ix, 83
 ORUSTIA Mörch. . ix, 225
 Orythia Mts. viii, 210; ix, 206
 Osbecki Phil. iv, 59.
 Oscarensis Cox, viii, 279; [ix, 131
 Oscari Kim. ii, 159.
 Oscitans Mts. iv, 47; . ix, 204
 Osculans C. B. Ad. iii, 8; ix, 64
 Osoriensis Woll. ii, 160.
Ossetinensis Bayer. . ix, 304
 Ossica Bttg. iv, 102; . ix, 303

- Ostiolum* Cr. ii, 180; . ix, 33
Osculum Thomae, . ix, 289
Otaheitana Fér. ii, 30.
Otala Beck, . ix, 96
OTALA Schum. . ix, 322
Otareæ Garr. ii, 77.
Otareæ Grt. . ix, 35
Otellina Riise. iii, 98; . ix, 58
Otis Beck, ix, 94.
OTOCONCHA Hutt. i, 253.
Otostoma Pfr. v, 176; . ix, 96
Othiana Fbs. iii, 11; . ix, 234
Ottoi Serv. . ix, 253
Ottonis Pfr. ii, 161.
Otwayensis Petterd. . ix, 34
Oualanensis Pse. iii, 41; ix, 35
Ousterea Mab. iv, 114; ix, 266
Outangensis Crosse, . ix, 287
Ouveana Souv. i, 120.
Ovatus Blauf. i, 176.
Oviformis Grat. vi, 68; ix, 153
Oviformis Semp. viii, 40; ix, 230
Ovirensis Rm. iii, 172; ix, 278
Ovivitellus Rve. ii, 71.
Ovoidea Brug. viii, 43; ix, 230
Ovularis Bgt. iii, 174; . ix, 272
Ovularis Mke. . ix, 225
Ovumreguli Lea, v, 44; . ix, 182
Ovum Val. ii, 30.
Oweniana Pfr. ii, 32.
Oxychilus Fitz. ii, 10.
OXYCHONA Mörch. . ix, 189
Oxygnatha Mörch. ix, xxiii.
Oxygyra Boiss. . ix, 268
Oxygyra West. . ix, 260
Oxynota Hartm. . ix, 261
Oxystoma Smith. . ix, 141
Oxytenes A. D. Brown, v, 103.
Oxytes Bens. ii, 129.
OXYTES Pfr. ii, 9, 129.
Oxytropis Lwe. iv, 33; ix, 242

Pacata Aust. ii, 99.
Pacifica Pfr. iii, 78.
Paciniana Ph. iv, 204; ix, 330
Pachesta L. & B. . ix, 250
Pachnodes Bttg. iii, 198; ix, 266
Pachya Alb. . ix, 149

Pachya Bgt. iv, 248; . ix, 320
Pachychila E. A. Sm. viii, [265; ix, 104
Pachygastra Gray, v, 90; ix, 91
Pachyloma Mke. . ix, 68
Pachypleura Bgt. . ix, 320
PACHYSPHERA Pils. . ix, 226
Pachystoma Guild. . ix, 96
Pachystoma Homb. & Jacq. ii, 30.
PACHYSTYLA Mörch. ii, 5, 24.
Pachystyla Pfr. vi, 184; ix, 135
Pachystyloides Cox; . ix, 135
Pachytoichea West. . ix, 335
Padana Stab. iv, 90; . ix, 301
Paeteliana Sh. iv, 152; ix, 327
Pagodiformis Smith, viii, 86; [ix, 23
Pagodula Pfr. iii, 73; . ix, 6
Pagodula Semp. iii, 77; ix, 6
Paivana Lwe. . ix, 327
Paivana Morel. . ix, 328
Paivanopsis Mab. iv, 182; [ix, 328

Paivanus Pfr. i, 62.
Paladilhi Bgt. iv, 11; ix, 255
Paladilhiformis Fag. . ix, 257
Palaensis Semp. ii, 120.
Palawanensis Pfr. . ix, 228
Palawanica Pfr. . ix, 104
Paleata Rve. . ix, 136
Paleosa Streb. iii, 50; . ix, 57
Pallaresica Fag. . ix, 259
Pallasiana Pfr. ii, 131.
Pallasii Dubois, . ix, 322
Pallens Gred. viii, 82; ix, 47
Pallens Mlldff. . ix, 223
Pallens Morel. i, 183.
Pallens Pse. iii, 91; . ix, 6
Pallescens Mlldff. . ix, 342
Pallescens Shuttl. v, 114; [ix, 90

Palliata Say, iii, 147; . ix, 77
Pallida Hedl. & Muss. viii, [281; ix, 134
Pallida Jeffer. . ix, 266
Pallida Mouss. . ix, 272
Pallida Tayl. . ix, 307
Pallida Tryon, ii, 188.

- | | |
|-------------------------------------|-------------------------------------|
| Pallidior C. & F. vi, 301 ; | Papillinspira G.-A. i, 182. |
| [ix, 156 | Papua Less. iii, 89 ; . ix, 5 |
| Pallidior Mouss. . ix, 47 | Papuensis Hedl. vii, 190 ; |
| Pallidula Moq. . ix, 272 | [ix, 229 |
| Pallidula Pfr. iii, 186. | Papuensis Q. & G. . ix, 142 |
| Palmana Berth. . ix, 325 | PAPUINA Martens, . ix, 136 |
| Palmaria Bens. ii, 54. | PAPUSTYLA Pils. . ix, 229 |
| Palmarum Morel, ii, 52. | Papyracea Brod. vii, 117 ; |
| Palmensis Braz. vi, 160 ; ix, 134 | [ix, 219 |
| Palmicola Stol. ii, 122. | Parableta Bttg. iv, 8 ; . ix, 255 |
| Paludicola Bens. iii, 104 ; ix, 37 | PARACHLORÆA Sandb. ix, 333 |
| Paludosa DaCosta. . ix, 283 | Paradensis Pfr. ii, 185. |
| Paludosa Pfr. iii, 129 ; ix, 73 | Paradoxa Cox, . ix, 34 |
| Palumba Souv.=sauliæ Pfr. | Paradoxa Pfr. vii, 102 ; ix, 215 |
| [not Rve.! vi, 209 ; ix, 104 | Paradoxa Semp. . ix, 230 |
| Palumboi Caf. iii, 251. | Paradozus Pfr. . ix, 231 |
| Pampelonensis Schm. iii, 246 ; | Paraguayana Pfr. ii, 175. |
| [ix, 252 | Parahelix Iher. ix, xxv. |
| Pamplonensis West.=pampelo- | Paraleuca Pils. vii, 142 ; ix, 222 |
| nensis. | Parallela Poey, v, 51 ; ix, 180 |
| Panayensis Prod. ii, 44. | Paramattensis Cox, ii, 178. |
| Panayensis Semp. vii, 168 ; | PARARHYTIDA Ancey, ix, 52 |
| [ix, 224 | Parasitarum Hde. . ix, 209 |
| Pan Brod. vii, 149 ; . ix, 223 | Parasitica Hde. . ix, 209 |
| Pan Pfr. . ix, 231 | PARATROCHUS Pilsbry, ix, 31 |
| Pancala S. & B. viii, 224 ; ix, 214 | Parcipila Mart. ii, 75. |
| Panchetensis G.-A. i, 182. | Pardalina Dh. . ix, 27 |
| Panciei Mlldff. iv, 88 ; . ix, 300 | Paretiana Issel, iv, 130 ; ix, 322 |
| PANDA Albers, . ix, 163 | Paricincta Mart. viii, 217 ; |
| Panda West. . ix, 272 | [ix, 204 |
| Pandoræ Fbs. iii, 228 ; ix, 200 | Parietalis Mts. ii, 15. |
| Pandynama Mab. . ix, 206 | Parietidentata Mill. v, 147 ; |
| Panescorsi Béreng. . ix, 251 | [ix, 94 |
| Pansa Bens. ii, 97. | Parilis Fér. v, 83 ; . ix, 91 |
| Pantanellii Stef. . ix, 266 | Parisiaca Mab. ii, 172. |
| Pantheia Mab. vi, 116 ; ix, 214 | Parisotiana (B.) Péch. . ix, 326 |
| Pantherina Hutt. viii, 65 ; | Parkeri Tryon. . ix, 199 |
| [ix, 14 | Parlatoris Biv. iii, 179 ; ix, 274 |
| Pantocratis Broem. . ix, 326 | Parma Hemph. . ix, 50 |
| Panurga Bgt. . ix, 251 | Parma West. ii, 158. |
| Papilio Lwe. iv, 45 ; . ix, 243 | Parmula Brod. vi, 229 ; ix, 109 |
| Papilionacea Val. . ix, 108 | Parnassia Roth. iv, 143 ; ix, 326 |
| Papilla Müll. vi, 216 ; . ix, 108 | Paropta Mab. vi, 55 ; . ix, 157 |
| Papillata Pfr. iii, 249. | Parraiana Orb. v, 50 ; . ix, 180 |
| Papillatus Pfr. i, 184. | Parreyssi Pfr. iii, 203 ; . ix, 266 |
| Papillifera Klika, . ix, 310 | Parryi Pons. & Sks. . ix, 289 |
| Papilliformis Kob. iii, 217 ; | Parsoni Cox, vi, 162 ; . ix, 134 |
| [ix, 169 | PARTHENA Albers, . ix, 98 |

- Parthenia Hag. . . ix, 256
 Parthenia Kob. . . ix, 343
 Parthenopæa West. ii, 189.
 Partita Pfr. ii, 95.
Partschii Bgt. . . ix, 325
 Partuliformis Bttg. vi, 72 ;
 [ix, 153
 Partuloides Brod. viii, 50 ;
 [ix, 231
 Partunda Angas, . . ix, 337
 Parumcincta Parr. . ix, 266
 Parva Parr. iii, 232 ; . ix, 249
 Parvidens Pse. iii, 64 ; . ix, 26
 Parvissima Cox, iii, 261 ; ix, 34
 Parvula Rang. iii, 32.
 Parvula Sterki, viii, 254 ; ix, 283
 Pascalia Caill. v, 186 ; ix, 167
Pascali Mab. . . ix, 274
Pascoeii Brazier, iii, 46 ; ix, 13
Pastorella Val. . . ix, 228
Pastorella West, . . ix, 256
 Patanæ Bens. ii, 96.
 Patasensis Pfr. iv, 81 ; . ix, 198
 Patens Reinh. viii, 257 ; ix, 283
Patera Alb. . . ix, 69
 Patescens Cox, ii, 123.
 Pathetica Parr. iv, 248 ; ix, 320
 Patina C. B. Ad. v, 102 ; ix, 89
 Patricia Pfr. vi, 196 ; ix, 219
Patruelis Ad. . . ix, 169
Patruelis Ang. vi, 131 ; . ix, 130
Patula Dh. . . ix, 48
 PATULA Held. . . ix, 48
Patula Hutt.=urnula Pfr.
Patularia Cless. . . ix, 46
 PATULASTRA Pfeiffer, . ix, 44
 PATULOPSIS Str. ii, 12, 188.
Patulopsis Suter, . . ix, 17
 Patungana Gredl. viii, 158 ;
 [ix, 209
 Paucicostata Pse. iii, 60 ; ix, 26
 Paucilirata Morel. ii, 166.
 Paucispira Poey, ii, 207.
 Pauli Bgt. . . ix, 256
Paulus Morel. iii, 27 ; . ix, 38
 Paupercula Lwe. iv, 35 ; ix, 244
 Pauper Gld. iii, 20 ; . ix, 47
 Pauxillula Bens. ii, 120.
 Pauxillus Gld. ii, 123.
 Pavelii, Haz. . . ix, 302
 Pavida Mouss. iii, 223.
 Paviei Morl. iii, 82 ; . ix, 4
Pazensis Poey, . . ix, 93
 Pazi Bgt. ii, 147.
 Pazii Ph. iii, 43 ; . ix, 41
 Peasiana Pfr. ii, 69.
 Pechaudi B., Anc. . . ix, 288
 Peculiaris A. Ad. . . ix, 169
 Pedemontana Pini, . . ix, 275
Pedestris Gld. . . ix, 76
 Pediana Bgt. . . ix, 251
 Pedianopsis Hagenm. . ix, 251
 Pedina Bens. ii, 91.
 PEDINOGYRA Albers, . ix, 158
 Pegorarii Poll. . . ix, 275
 Peguensis Bens. vi, 113 ; ix, 204
 Peguensis Theob. i, 180.
 Pekinensis Dh. viii, 205 ; ix, 206
 Pelechystoma Tap.-Can. vii,
 [35 ; ix, 141
 Pelewana Mouss. vii, 99 ; ix, 215
 PELIA Alb. iii, 19, 102. (*Zoniti-*
 dæ).
 Peliomphala Pfr. vi, 99 ; ix, 213
 Peliosanthi Mörch, ii, 67.
 Pelhostoma Mart. ii, 51.
Pella Albers, . . ix, 37
Pella Auct. . . ix, 267
 Pellicula Fér. v, 14 ; . ix, 187
Pelliculata Poey, . . ix, 187
 Pellisboæ Hupé, v, 180 ; ix, 166
 Pelliscolubri Ph. iv, 80 ; ix, 198
Pellislacerti Rv. . . ix, 327
 Pellisserpentis Ch. v, 178 ; ix, 166
Pellisserpentis Hupé, . ix, 166
 Pellita Fér. iv, 115 ; . ix, 277
 Pellucens Sh. iii, 232 ; . ix, 249
 Pellucida Gld. ii, 128.
Pellucida Penn. ii, 138.
 Pelogosana Stoss. . . ix, 324
 Pelopica Bgt. iv, 149.
 Pemphigodes Pfr. v, 12 ; ix, 187
 Penangensis Stol. iv, 63 ; ix, 116
 Penchinati Bgt. iv, 16 ; ix, 253
Penicillata Gld. v, 33 ; ix, 187
Penicillata Poey, . . ix, 185

- Pennantiana Pfr. vii, 36; ix, 141
 Pennsylvanica Green, iii,
 [151; ix, 77
 Penolensis Cox, ii, 179.
 Pentodon Mke.=*Strophia*, q. v.
 Peracanthoda Bgt. iii, 54;
 [ix, 281
 Peracutissima C. B. Ad. v,
 [106; ix, 89
 Peræruginosa Hde. . ix, 170
 Peraffinis C. B. Ad. iii, 98;
 [ix, 57
 Peraffinis Pils. vii, 139; ix, 222
 Perakensis Cr. vii, 82; ix, 170
 Perakensis Nev. ii, 61.
 Perarcta Blanf. iii, 162; ix, 146
 Perarmata Smith, . ix, 339
 Percarinata Marts. ii, 51.
 Percompressa Bens. iii, 84;
 [ix, 4
 Percussa Hde. vi, 111; ix, 124
 Percyana Smith, vi, 42; ix, 157
 Perdepressa C. B. Ad. iii,
 [100; ix, 58
 Perdepressa Pils. . ix, 223
 Perdepressa West. . ix, 262
 Perdita Desh. ii, 171.
 Perdita Hutt. viii, 76; ix, 18
 Perdita Rve. . ix, 229
 Peregra Parr. . ix, 267
 Peregrina Arad. & Mag. ii, 159
 Perelevata Pils. . ix, 182
 Pererosa Woll. . ix, 242
 Perfecta Bgt. . ix, 302
 Perforata Dh. ii, 123.
 Perforata West., . ix, 304
 PERFORATELLA Schlüter,
 [ix, 277
 Perfucata Bens. ii, 124.
 Pergranulatus Godet, ii, 136.
 Perigrapta Pils. . ix, 77
 Perinflata Pfr. viii, 282; ix, 131
 Peritricha Bttg. viii, 230;
 [ix, 303
 Peritropis Pils. v, 140; ix, 94
 Perlevis Sh. iii, 181; ix, 274
 Perlineata Mouss. . ix, 304
 Perlucida H. Ad. ii, 107.
 Perlucida Iss. ii, 117.
 Perlutosa Hag. . ix, 257
 Permellita Hde. . ix, 210
 Permodesta Streb. ii, 165.
 Permollis Stol. i, 177.
 Pernobilis Fér. ii, 33.
 Peroni Brazier, . ix, 33
 Perpaula Bens. ii, 89.
 Perplanata Pils. viii, 181;
 [ix, 260
 Perplanata Nev. iv, 57; ix, 209
 Perplexa Fér. v, 89; ix, 91
 Perplicata Bens. iii, 106; ix, 38
 Perpolita Mouss. ii, 113.
 Perraudierei Grass. iv, 176;
 [ix, 327
 Perrieri Mab. iv, 160; ix, 327
 Perroquiniana Cr. ii, 167;
 [ix, 54
 Perrotteti Pfr. ii, 94.
 Perroudiana Loc. iv, 8; ix, 255
Perruginea Mke. . ix, 336
 Perryi Jay, vi, 108; ix, 214
 Persculpta Sm. . ix, 340
 Persianii Tib. iv, 220; ix, 332
 Persica Bttg. iv, 85; ix, 304
 Persica Rosen. . ix, 283
Persimilis Dh. . ix, 224
 Persimilis Shutt. iv, 19; ix, 258
 Personata Drap. iii, 147; ix, 309
 Persordida Let. & Bgt. iii, 185.
 Perspectiva Blanc. ii, 158.
Perspectiva Fér. . ix, 47
Perspectiva Mühl. . ix, 47
 Perspectiva Say, iii, 20; ix, 48
 Perspectiva Sterki, viii,
 [257; ix, 284
Perspectiva Wagn. i, 61.
 Pertenuis Gld. ii, 116.
 Peruviana Lam. . ix, 165
 Pervia Muhlf. . ix, 302
 Petasia Beck, ii, 11; ix, 278
 Petasina Mörch. . ix, 277
 Petasus Bens. ii, 109.
 Petasussinensis Hde. ii, 218.
 Petholata Oliv. . ix, 336
 Petitiona Orb. v, 60; ix, 97
 Petrea Anc. iii, 238.

- Petricola Paul. ii, 142.
 Petrobia Bens. iii, 107; ix, 38
 Petronella Charp. ii, 154.
 Petrophila Bld. ii, 162.
 Petrosa Hutt. ii, 91.
Petterdiana Taylor, . ix, 34
Petterdi Brazier, . ix, 33
Petterdi Cox, . ix, 13
 Pettos v. Mart. iii, 156; ix, 146
 Peucetana Kob. iv, 122; ix, 332
 Pexa Cox, iii, 25; . ix, 34
 PFEIFFERIA Gray, . ix, 221
Pfeifferianus Rve. . ix, 228
Pfeifferi Phil. ii, 77.
Pfeifferi Semp. vii, 162; ix, 224
 PHACUSSA Hutton, . ix, 12
Phædra Alb. . ix, 183
Phædra Pfr. v, 23; . ix, 186
Phæogramma Anc. . ix, 213
Phæogramma Pfr. v, 42; [ix, 183
Phæolemma Bttg. iv, 87; ix, 304
Phæostoma Mart. vii, 47; [ix, 140
Phæostyla Pfr. viii, 41; ix, 230
Phæozona Mts. iii, 205; ix, 204
Phæozona Mts. iii, 205; ix, 266
Phalerata W. & B. iv, 19; [ix, 258
Phalerata Zgl. iv, 100; ix, 302
Phania Alb. . ix, 154
Phari Fagot, iii, 241; . ix, 255
 PHASIS Albers, . ix, 36
Phayrei Theob. iv. 55; ix, 210
 PHENACHAROPA Pilsbry, [ix, 29
Phenacohelicidae Sut. ix, xxxi.
 PHENACOHELIX Suter, . ix, 16
 Phenax Pils. vi, 69; . ix, 153
 PHENGUS Alb. . ix, 230
Philammia Bgt. viii, 185; [ix, 261
Philesia West, . ix, 259
Philibinensis Friv., Rm. iv, [249; ix, 320
Philibensis Pfr. . ix, 320
Philidora Morg. . ix, 115
Philina Alb. . ix, 107
Philippinensis Pfr. vii, 201; [ix, 227
Philippinensis Semp. vi, 123; [ix, 214
Philippinensis Semp. viii, 82; [ix, 27
Philippinicum Mlldff. ix, 52
Philippi Testa, ii, 147.
 Phillipsiana Ang. iv, 66; ix, 114
 Philomela Ang. vii, 8; ix, 140
 Philomiphila Mab. . ix, 256
 Philora Bgt. . ix, 256
 Philoxera Caf. . ix, 251
 Philyrina Morel. ii, 27.
 Phlebophora Lwe. . ix, 293
Phlogophora Pfr. . ix, 18
 Phloiodes Pfr. vii, 163; ix, 224
 Phlyaria Mab. viii, 158; ix, 146
 Phocæa Roth. iv, 103; . ix, 301
 Phoebeia Let. & Bgt. . ix, 251
 PHŒNICOBIVS Mörch. . ix, 104
 Phœnix Pfr. vi, 80; . ix, 154
 Phonica Mab. vii, 83; . ix, 170
 Phorochætia Bgt. . ix, 275
 Phragmitum Hde. iv, 48; ix, 204
 PHRIXGNATHUS Hutton, ix, 9
 Phryganophila Mab. . ix, 258
 Phryne Pfr. . ix, 112
 Phrynica Hutt. viii, 61; ix, 9
 Phthiota West. . ix, 256
Phthisica Pfr. . ix, 140
 Phulongensis G.-Aust. ii, 53.
 Phyllophaga Hde, iii, 221; [ix, 170
 Phyllophila A. Ad. ii, 178.
 Phyllophila Bens. ii, 59.
 Physalis Pfr. vii, 115; . ix, 221
 Physeta Anc. iv, 50; . ix, 204
 Phytostylus Bens. ii, 176; viii, 135.
Piatigorskiensis Bayer, . ix, 259
Picena Tib. iv, 109; . ix, 331
Picea Grt. . ix, 25
Picea Zgl. iv, 117; . ix, 306
Piccata Gredl. iv, 237; ix, 319
Picena (Tib.) Kob. . ix, 266
Picta Born. v, 53; . ix, 189
Picta Hemph. viii, 118; ix, 50

- Picta* Sm. vii, 112; . ix, 220
Pictella Beck, . ix, 187
Pictilis Tate, . ix, 10
Pietonica Bgt. ii, 156.
Pictonum Bgt. . ix, 256
Pictor Brod. viii, 8; . ix, 228
Pictoria Perry, . ix, 189
Picturata Poey, . ix, 185
Picturata C. B. Ad. v, 113; [ix, 90
Piestius Bgt. . ix, 234
Pietruskyana Parr. iii, 176; [ix, 275
Pila C. B. Ad. iii, 8; . ix, 64
Pilatica Bgt. ii, 156.
Pileata Gmel. . ix, 141
Pileiformis Moric. v, 131; [ix, 190
Pileolus Fér. vii, 29; . ix, 141
Pileolus Lesson, . ix, 137
Pileus Müll. vii 24; . ix, 141
Pilidion Bens. vi, 114; ix, 204
Pilifera Jick. . ix, 268
Pilifera Mart. iii, 190; ix, 268
Piligera Andr. . ix, 267
Piligera Bl. & W. . ix, 288
Pilisparsa Mart. viii, 192; [ix, 116
Pilosa Alten. . ix, 275
Pilosa Kob. iv, 112; . ix, 305
Pilosa Mart. . ix, 119
Pilosa Stentz. iv, 97.
Pilsbrya Anc. . ix, 193
Pilsbryi Suter, . ix, 339
Pilula Mouss. . ix, 249
Pilula Rve. ii, 212; . ix, 16
Pimesoma Pils. v, 95; . ix, 180
Pinacis Bens. iii, 159; . ix, 146
Pinchoniana Hde. . ix, 211
Pindica Bttg. iv, 96; . ix, 303
Pinguis Anc. . ix, 171
Pinguis Krauss, iii, 103.
Piniana Poll. ii, 220.
Pinicola Pfr. i, 121; . ix, 33
Pinii Adami, iv, 106; . ix, 301
Pinii Ad. iii, 51; . ix, 44
Pinii West. . ix, 256
Pinnocki Liardet, ii, 180.
Pipaensis Petterd, . ix, 338
Pirajnea Ben. iii, 192; ix, 272
Piratarum Kob. iii, 240; ix, 249
Pirongiaensis Sut. . ix, 9
Pirrieana Pfr. iii, 63.
Pisana Müll. iii, 224; . ix, 336
Pisanella Serv. . ix, 336
Pisaniformis Bgt. iii, 227; [ix, 337
Pisanoides Orb. . ix, 337
Pisanopsis Serv. iii, 225; ix, 336
Pisanorum Bgt. . ix, 257
Pisiformis Pfr. iii, 197; ix, 266
Pisolina Gld. iii, 108.
Pisum Beck, . ix, 68
Pithogastra Fér. vii, 200; [ix, 227
Pithohelix Swains, . ix, 227
Pittse Pva. iv, 44; . ix, 243
Pittorii Dup. . ix, 288
Pityonesica Pfr. v, 49; ix, 180
Pitys Beck, . ix, 22
Pitys Pease, . ix, 26
Placentula Lowe, . ix, 243
Placentula Shuttlew. ii, 163.
Placita G.-Aust. ii, 57.
Plagiata Beck, . ix, 41
Plagiocheila T.-C. vi, 295; [ix, 113
Plagioglossa Pfr. iii, 133; ix, 74
PLAGIOPTYCHA Pfr. . ix, 185
Plagiptycha Shutt. ii, 174; [ix, 57, 58
Plagiostoma Pfr. vii, 19; ix, 140
Plana Dkr. . ix, 73
Plana Mil. . ix, 274
Planaria Cless. ii, 153.
Planaria Mouss. iii, 122; ix, 289
Planasi Hid. viii, 202; ix, 170
Planata Chemn. iii, 226; ix, 337
Planata Hde. ii, 123.
Planata Lwe. iv, 191; . ix, 293
Planatella Cless. . ix, 251
Planella Pfr. ii, 151.
Planibasis Cox, . ix, 134
Planilabris Cox, i, 171.
Planior Pils. v, 188; . ix, 167
PLANISPIRA Beck, ix, 110, 111

- Pæcilostylus* Pilsbry, ix, 158
Pœcilotrochus Mlldff. . ix, 170
Pæcihozonites Bttg. iii, 19,
 [viii, 55, 134; ix, 65
Pæcilus Alb. . . ix, 225
Pœyi Petit, iv, 83; . ix, 181
Pointhameli Mts.=feisthameli
 Hupé.
Poiretia M.-T. . . ix, 307
Poiretiana Pfr. vii, 27; . ix, 141
Poirieri Tap.-Can. vii, 27;
 [ix, 141
Polilleusis Pfr. vii, 138; ix, 222
POLITA Held. ii, 10, 145.
Polita Paul. iv, 219; . ix, 331
Politissima Pfr. ii, 93.
Politissimus Beck, i, 173.
Pollenzensis Hid. iii, 257; ix, 260
Pollinensis Paul. viii, 252;
 [ix, 283
Pollinii DaC. iv, 245: . ix, 319
Pollodonta d'Orb. iii, 126;
 [ix, 82
Pollux Theob. ii, 129.
Polychroa Binn. . . ix, 184
Polychroa Sowb. . . ix, 225
Polycycla Morel. iii, 125;
 [ix, 83
POLYDONTES Montf. ix, 87, 97
Polydora Mab. vi, 50; . ix, 156
Polygyra Mlldff. ii, 68.
Polygyra Poll. ii, 220.
POLYGYRA Say, . . ix, 68
Polygyrata "Binn." Pfr. ix, 73
Polygyrata Born. iii, 124;
 [ix, 82
POLYGYRATIA Gray, ix, 82, 342.
POLYGYRELLA Binney, ix, 78
Polygyrella Bld. & Coop. iii,
 [129; ix, 80
POLYGYRINÆ, . . ix, xxxii
POLYMITA Beck, . . ix, 187
Polymorpha Lwe. iv, 44; ix, 243
POLYPLACOGNATHA, ix, xxix
Polypleuris Blanf. iii, 52.
Polyodon Sowb. iii, 62; viii,
 [93; ix, 28
Polyodon Weinl. & Mart. ii,
 [201; ix, 65
Polyptychia Mlldff. . ix, 146
Polytænia Mart. . . ix, 183
Polytæniata Pils. v, 30; ix, 184
Polytrichia Anc. . . ix, 257
Polyzonalis Beck, . . ix, 153
Polyzona Mlldff. vi, 207; ix, 104
Pomacea Perry, . . ix, 316
Pomacella Parr. iv, 247; ix, 320
Pomaria Müll, . . ix, 319
Pomatella Tib. iv, 243; ix, 319
Pomatia Leach, . . ix, 316
Pomatia L. iv, 236; . ix, 319
Pomeliana Bgt. ii, 157.
Pomiformis Braun, . . ix, 310
Pompeiana Bgt. . . ix, 250
Pompylia Shuttlew.. ii, 204.
Pomumadami Green, ii, 198.
Pomum Pfr. vi, 178; . ix, 135
Ponderosa Pfr. vii, 147; ix, 222
Pondicherriensis Pfr. ii, 76.
Ponentina Dup. . . ix, 274
Ponsii Hid. iii, 257; . ix, 260
Ponsonbyana Pils. viii, 190;
 [ix, 274
Ponsonbyi Ang. . . ix, 164
Ponsonbyi G. A. . . ix, 145
Ponsonbyi Kob. viii, 183;
 [ix, 260
Ponsonbyi West. not Kob.
 [ix, 274
Pontica Bttg. ii, 193.
Pontica Bttg. iv, 86; . ix, 304
Poongee Theob. ii, 98.
Porcaria Mab. vi, 45; . ix, 157
Porcellana Grat. vi, 283; ix, 112
Porcina Say, . . ix, 78
Pornæ Serv. iii, 31; . ix, 45
Poromphala Lwe. iv, 44; ix, 243
Porphyria Pfr. ii, 32.
Porphyrostoma M. & P. viii,
 [262; ix, 173
Porracea Jay, . . ix, 231
Porrecta Q. & M. . . ix, 280
Porroi Paul. ii, 190.
Portei Pfr. . . ix, 222

- Portei Pfr. vii, 206; . ix, 227
 Porteri Cox, vi, 263; . ix, 122
Portia Gray, ii, 213; . ix, 13
 Porti Braz. ii, 181.
Portii Pfr. . ix, 227
 Portoricensis Pfr. iii, 96; ix, 58
 Portosanctana Sowb. iv, 199;
 [ix, 293
 Portosancti Woll. . ix, 293
 Posidonienensis Tib. iv, 219;
 [ix, 331
Positura Cox, iii, 262; . ix, 13
 Postelliana Bld. iii, 137; ix, 73
Potua Chier. . ix, 283
 Pouchet Fér. iv, 167; . ix, 327
 Poupillieri Bgt. iii, 29; ix, 45
 Pouzolzi Desh. iv, 87; . ix, 300
Pouzolzi Payr. nom. nud!!
Pouzonensis Fag. . ix, 255
 Poweri H. Ad. ii, 107.
 Præcellens Mts. i, 179.
 Præclara Caf. iii, 252; . ix, 260
 Prædisposita Mouss. iv, 145;
 [ix, 325
 Præposita Mouss. . ix, 258
 Prærupta West. . ix, 272
 Præstans Bl. & W. . ix, 319
 Præstans Gld. i, 179.
 Præstans Pfr. v, 184; . ix, 167
Prætexta Jan. . ix, 330
 Prætexta Mart. ii, 73.
 Prætexta Parr. iv, 99; ix, 301
 Prætermisssi Cox, vi, 167; ix, 134
Prætextata Kob. . ix, 301
 Prætumida Fér. ii, 106.
 Prætutia Tib., iv, 243; . ix, 319
 Prævalens Anc. iii, 238.
Prasina Koch. . ix, 215
 Prasinata Roth. iv, 252; ix, 320
 Pratensis Pfr. iv, 85; . ix, 304
Praticola Strebel. . ix, 67
 PRATICOLELLA Mart. . ix, 67
Præauxii Hartm. . ix, 261
 Preslii Schm., iv, 104; . ix, 302
 Pressa Mouss., iii, 14; . ix, 234
 Pressula Morel. iii, 50; . ix, 199
Pretiosa Alb. . ix, 209
Pretiosa C. B. Ad. v, 100;
 [ix, 89
Prevostiana Cr. i, 123; . ix, 20
Prevostiana Risso. . ix, 274
 Prietoi Hid. iii, 257; . ix, 260
 Primæva Morel. iv, 195; ix, 294
 Princei Liard. iii, 27; . ix, 35
 Princeps Rve. vii, 137; . ix, 222
 Pringi Pfr. iv, 32; . ix, 264
 Prinohila Mab. . ix, 251
 Prionacis Bens. viii, 137; ix, 38
 PRISTILOMA Anc. viii, 111.
Pristina Anc. iii, 102.
 Privata Gall. . ix, 251
 Proba A. Ad. iii, 185.
 Problematica Pfr. i, 66.
 Proboscidea Pfr. v, 66; ix, 97
Procera Pfr. . ix, 94
 PROCHILUS Alb. . ix, 231
 Proclivis Mts. viii, 187; ix, 272
Proctostoma Mab. . ix, 289
Procumbens Gld. . ix, 116
Prodigium Bens. . ix, 146
 Præclara C. & F., vi, 300;
 [ix, 156
 Profuga Schm. iv, 7; . ix, 255
 Profunda Say, iii, 155; . ix, 76
 Proles Hemph. . ix, 199
 Proletaria Morel. ii, 106.
 Promæca Bgt. . ix, 319
 Prometheus Bttg. iii, 199; ix, 268
 Prominula Pfr. . ix, 58
 Prona Nev. ii, 102.
 Pronoe Serv. iii, 31.
Pronuba West. . ix, 320
 Propenuda Ad. v, 115; . ix, 90
 Prophetarum Bgt. iii, 12; ix, 234
 Propinqua Hutt. viii, 72; ix, 13
 Propinqua Pfr. iv, 63; . ix, 124
 Propria Gall. . ix, 257
 PROSERPINULA Alb. ii, 12, 201.
Proserpinula Pfr. ii, 201.
 Prosperus Alb. vi, 80; . ix, 154
 Prostrata Pse. . ix, 36
 Protea Ziegl. iv, 5; . ix, 255
 Protensa Fér. ii, 194.
Protensa Parr. ii, 194.

- PROTOGONA, . . . ix, xxxii
 Provincialis Ben. iv, 208; ix, 330
 Provisoria Pfr. v, 63; . ix, 97
 Proxima Fér. iv, 63; . ix, 116
 Proxima Grt. iii, 39; . ix, 35
 Prudhoensis Smith, . ix, 343
 Pruinosa Pfr. iii, 186; . ix, 58
Prunum Auct. . . ix, 122
 Przewalskii Mts. viii, 209;
 [ix, 206
Psadara Mill. . . ix, 166
Psamitus Bgt. . . ix, 335
Psammæcella Let. & Bgt.
 [ix, 264
Psammæcia Bgt. . . ix, 264
Psammathæa Let. & Bgt. ix, 251
Psammita (B.) West, . ix, 248
Psammoica Morel, . ix, 264
Psammophora Lwe. iv, 191;
 [ix, 293
Psara Bgt. . . ix, 254
Psaropsis Loc. . . ix, 254
Psathyra Lwe. iv, 183; . ix, 328
Psatura Bgt. ii, 155.
Psaturochaeta Bgt. iii, 182;
 [ix, 274
Pseudenhalia Bgt. . ix, 249
 PSEUDIBERUS Ancy, . ix, 207
 PSEUDOBBA Mlldff. . ix, 105
Pseudobuliminus Gredl. ix, 171
Pseudobuliminus Hde. iv,
 [31; ix, 171
Pseudocampylæa Hesse, ix, 276
 PSEUDOCAMPYLÆA Pfr. ix, 293
Pseudochinensis Möll. iv, 60;
 [ix, 210
Pseudocoma Sut. . . ix, 33
Pseudocorasia Strub. viii,
 [293; ix, 125
Pseudodiaphana Cout. ii, 143.
Pseudoembia Bgt. iv, 141;
 [ix, 325
Pseudoglobula Mss. iii, 197;
 [ix, 266
Pseudohyatina Bgt. ii, 144.
 PSEUDOHYALINA Mse. ii, 13, 201.
Pseudolabium Pfr. vii, 38;
 [ix, 142
Pseudoleioda Sut. viii, 88;
 [ix, 28
 PSEUDOLEPTAXIS Pils. . ix, 294
Pseudomeadei Braz. . ix, 135
Pseudoparilis Grat. . ix, 91
Pseudoparnassia Mouss. ix, 325
Pseudopphis W. Blanf. iii,
 [162; ix, 146
Pseudoplanorbis Lub. iii,
 [126; ix, 83
Pseudoplanorbis Mouss. iii,
 [91; ix, 6
Pseudopomatia Bl. iv, 244;
 [ix, 319
Pseudoprunum Pils. viii,
 [271; ix, 122
Pseudosericea Ben. iii, 196;
 [ix, 272
Pseudosericina Mlldff. . ix, 337
Pseudovitrinoides Nev. ii, 90.
Pseudoxerophila West, . ix, 251
Pseustes Sm. viii, 92; . ix, 28
Psiloritana Malz. viii, 162;
 [ix, 255
Psittacina Dh. vii, 118; ix, 219
Psyche Ang. vii, 110; . ix, 220
Psyra Hutt. . . ix, 14
Pterididea Zgl. iii, 174.
 PTERODISCUS Pilsbry, . ix, 36
Pterolake Kob. . . ix, 301
Pterotropis, error for PTERO-
 [DISCUS, ix, 31
Pthonera Mab. iii, 123; ix, 289
Ptychodes Pfr. iii, 100; ix, 58
Ptychodia Bgt. viii, 184; ix, 261
 PTYCHODON Ancy, . ix, 27
Ptychomphala Pfr. i, 123.
Ptychopatula Pils, . ix, 54
Ptychophora A. D. Br. iii,
 [154; ix, 76
Ptychoraphe W. & M. ii, 197.
Ptychostyla Mart. iv, 58; ix, 171
Ptychostyla Pfr. . . ix, 171
Ptychostylus Mlldff. . ix, 226
Ptycodia Monts. . . ix, 261
Ptylota Bgt. iii, 181; . ix, 274
Puberosula Hde. iv, 56; ix, 211
Puberula Hde. iii, 183; . ix, 275

- Pubescens* Pfr. iii, 184; . ix, 58
Pubescens Tib. iv, 91; . ix, 301
Pubicepa Mart. vii, 90; . ix, 125
Pudibunda Beck, . ix, 182
Pudibunda Cox, ii, 214.
Pudibunda Semp. vii, 171; . [ix, 221
Pudica G.-A. vii, 195; . ix, 209
Pudica Pfr. vii, 69; . ix, 143
Pudiosa Paul, iv, 217; . ix, 331
Pudiosa Zgl. ii, 150.
Puella Brod. vii, 120; . ix, 220
Puellula Bens. . ix, 170
Puerocunæ Peron. ii, 24.
Pugnax West, . ix, 256
Pulchella Beck, . ix, 187
Pulchella Ckll. . ix, 342
Pulchella Mlldff. . ix, 225
Pulchella Müll. viii, 248; . [ix, 283
Pulchella Rm. . ix, 325
Pulchellula Hde. . ix, 283
Pulcherrima Hartm. viii, 134.
Pulcherrima Sowb. vii, 133; . [ix, 222
Pulchra Paiva. . ix, 240
Pulchra Pils. vii, 143; . ix, 222
Pulchrior Ad. v, 41; . ix, 183
Pulchrior Pils. . ix, 231
Pullula Parr. . ix, 252
Pulskyana Haz. iv, 237; ix, 319
Pulveratricula Mts. viii, 211; . [ix, 206
Pulveratrix Mts. viii, 211; . [ix, 206
Pulverella Mts. . ix, 206
Pulverulenta Hde. . ix, 211
Pulverulenta Lwe. iv, 43; ix, 260
Pulvinaris Gld. iii, 157; ix, 146
Pulvinata Lwe, iv, 45; . ix, 243
Pulvisculum Iss. iii, 191; ix, 52
Pumicata Morel. ii, 89.
Pumila Hutt. viii, 63; . ix, 9
Pumilio Pfr. iv, 27; . ix, 261
Punctata Born, not Müll. ix, 91
Punctata Müll. iv, 131; . ix, 324
Punctata Wagn. . ix, 167
Punctatissima Jen. . ix, 324
Punctella M.-T. . ix, 336
Punctidæ Gill. . ix, xxxi
Punctifera Grt. ii, 113.
Punctifera Lm. . ix, 97
Punctiperforata Grt. iii, 66; . [ix, 26
Punctulata Sowb. iv, 187; . [ix, 239
Punctum Morel. iii, 53; . ix, 57
PUNCTUM Morse, . ix, 6
Punica Morel. iv, 129; . ix, 324
Pupilla Serv. . ix, 263
PUPISOMA Stol. . ix, 52
Pupula Gld. ii, 178.
Pura Alder ii, 152.
Pura West, . ix, 322
Purchasi Pfr. vii, 108; . ix, 220
Purpuragula Lea, . ix, 182
Purpurascens Mts. . ix, 222
Purpurascens Pfr. viii, 297; . [ix, 214
Purpureostoma LeGuill. vi, [177; ix, 113
Pusilla Lwe. iii, 31; . ix, 45
Pusilla Pfr. ii, 174.
Pusillus Gld. ii, 123.
Pusiodon Swains, . ix, 107, 110
Pusio King, iii, 47; . ix, 41
Pustula Fér. iii, 131; . ix, 73
Pustulata Mühl. . ix, 255
Pustulina Reinh. ii, 178.
Pustuloides Bld. iii, 132; ix, 73
Pustulosa Parr. . ix, 249
Puteolus Bens. . ix, 146
Putoniana Mab. iii, 194; ix, 266
Putoni Cless. . ix, 274
Putrescens Lwe. iii, 31; ix, 47
Pycnia Bgt. iv, 253; . ix, 320
Pycnochilia Bgt. . ix, 324
PYCNOGYRA Streb. ii, 13, 204.
Pygmæa Bttg. ii, 139.
Pygmæa Bttg. . ix, 304
Pygmæum Drap. iii, 29; ix, 8
Pygmæum Spix, i, 64.
Pylaïca Bens. ii, 132.
Pyramidalis Jeffr. . ix, 47
Pyramidalis Sowb. viii, 28; . [ix, 229

- Pyramidata Drp. iv, 23; ix, 263
 Pyramidata Mart. . ix, 141
Pyramidatoides Orb. ix, 58, 263
 Pyramidea Mart. ii, 50.
 Pyramidella Jan. . ix, 263
Pyramidella Spix, Wagner, [ix, 190
 PYRAMIDULA Fitz. . ix, 42
 Pyramis Hde. ii, 218.
 Pyramis Phil. iv, 30; . ix, 262
 Pyrenaica Dr. iv, 94; . ix, 302
Pyrenaica Rossm. . ix, 325
 Pyrenaica Sterki, . ix, 283
Pyrgia Bgt. . ix, 319
 PYROCHILUS Pilsbry, . ix, 154
 Pyrostoma Fér. vi, 194; ix, 155
 PYRRHA Hutton, . ix, 15
Pyrrhozonia Ph. viii, 204; ix, 206
Pythohelix Swains. . ix, 227
 Pythonissa Tap.-Can., vii, 31;
 [ix, 141
 Pyxis Hinds, vii, 80; . ix, 143

 Quadrasi Hid. iii, 116; . ix, 288
 Quadrasi Hid. viii, 122; ix, 4
 Quadrasi Hid. viii, 34; . ix, 230
 Quadrasi Mldff. . ix, 340
 Quadrasi Mldff. . ix, 344
 Quadrata Fér. iii, 47; . ix, 41
 Quadricincta Morel. iv, 182;
 [ix, 328
 Quadridentata Brod. v, 168;
 [ix, 95
Quadridentata Mke. . ix, 89
 Quadrifasciata LeGuill. vi,
 [280; ix, 111
 Quadrispira Mart. iii, 33.
 Quadrivittata Hid. v, 190;
 [ix, 166
 Quadrivolvus Mart. vi, 299;
 [ix, 113
 Quesita Dh. vi, 108; . ix, 214
 Quæstiosa Cox, iii, 261.
 Quaternarius Hde. . ix, 171
 Quedenfeldti Mart. viii, 235;
 [ix, 330
 Quercina Pfr. vi, 257; . ix, 121
 Quieta Rve. vi, 271; . ix, 124

 Quimperiana Fér. iv, 116;
 [ix, 308
 Quinaria Pfr. vi, 269; . ix, 124
 Quincayensis Bgt. . ix, 318
Quinceianensis Mauduyt, ix, 318
Quinquedentata F. & C. ix, 74
 Quinquelirata Sm. viii, 150;
 [ix, 82
 Quintali Cox, ii, 212.
 Quirosi Cox, vii, 80; . ix, 143
 Quisquilæ Paul, viii, 164;
 [ix, 255
 Quitensis Pfr. ii, 175.
 Quoyi Desh. vi, 213; . ix, 105

 Rachgonica Bgt. . ix, 251
 Rachiodia Bgt. iii, 194; ix, 266
 Radama Less. vi, 38; . ix, 157
 Raddei Bttg. ii, 181.
 Raddei Bttg. iv, 251; . ix, 320
Radesiana Marès, . ix, 336
 Radians Pfr. ii, 115.
Radiaria Pfr. ii, 213; . ix, 339
Radiata DaC. . ix, 47
Radiata Mldff. . ix, 342
Radiata Ulic. iv, 238; . ix, 319
Radiata West, . ix, 266
Radiatella Reinh. ii, 171.
Radiatula Alder, ii, 152.
 Radicalis Mouss. ii, 210; ix, 35
 Radicicola Bens. iii, 210; ix, 205
 Radiella Pfr. iii, 38; . ix, 26
Radiolata Andr. . ix, 254
Radiolata Jan. . ix, 254
Radiolata Morel. iii, 184.
Radiolata Mss. iii, 240; ix, 249
Radiolata Mts. ii, 51.
 Radiosa Ziegl. iv, 241; ix, 319
Radula Pfr. . ix, 337
Radula Sandb. . ix, 295
 Radulella Hde. iv, 57; ix, 210
 Radulina Hde. . ix, 170
Raffrayana Ckll. . ix, 281
 Raffrayi Bgt. i, 184.
 Raffrayi Bgt. ii, 60.
Raffrayi Bgt. . ix, 281
 Raffrayi Tap.-Can. iii, 128;
 [ix, 84

- Rufinesquea* Fér. ii, 196.
Ragusæ Kob. iv, 208 ; . ix, 330
Ragusana Fér. . . ix, 300
Rahtii Braun. . . ix, 310
Raimondii Phil. v, 172 ; ix, 95
Rainbirdi Cox, vi, 157 ; ix, 133
Ramburiana Mab. & LeM. ii, 121
Ramburi Mab. iv, 6 ; . ix, 254
Ramentosa Gld. iv, 73 ; ix, 199
Ramisi Bgt. . . ix, 326
Ramlensis Bgt. . . ix, 251
Ramondi d'Orb. . . ix, 73
Ramonis d'Orb. . . ix, 73
Ramsayi Cox, iii, 109, viii, 147.
Ramsayi Liard. ii, 121.
Ramsdeni Ang. . . ix, 140
Ramsgatensis Cox, iii, 265 ;
 [ix, 34
Rangelina Pfr. v, 66 ; . ix, 97
Rangiana Fér. iii, 121 ; ix, 288
Rangii Auct. . . ix, 288
Rangii Less. vii, 53 ; . ix, 142
Ranzani Orsini. . . ix, 271
Rapa Müll. ii, 72.
Rapida Pfr. i 129.
Raratoungensis Pse. iii, 64 ;
 [ix, 27
Rareguttata Mouss. ii, 69.
Raricostata Sut. viii, 100 ; ix, 9
Raripila Morel. iii, 101 ; ix, 58
Rariplicata Bens. iii, 107 ;
 [ix, 38
Raspailii Payr. iv, 112 ; ix, 305
Raterana Serv. ii, 220.
Rathousii Hde. ii, 104.
Ravergiensis Fér. iv, 85 ; ix, 304
Ravergieri Bttg. . . ix, 304
Ravergii Kryu. . . ix, 304
Ravida Bens. iv, 48 ; . ix, 205
Ravidula Hde. iv, 49 ; ix, 205
Ravnii Beck, . . ix, 97
Rawnesleyi Cox, viii, 282 ;
 [ix, 133
Rawsonis Barel. ii, 22.
Raymondi Tryon, ii, 67.
Raymondi Moq. iv, 149 ; ix, 325
Raynali Gass. i, 119.
Realis Mühlf. ii, 112, 115.
Rebellis Hde. iii, 183 ; ix, 275
Reboudiana Bgt. iv, 6 ; ix, 255
Recedens Garr. iii, 72 ; ix, 24
Recedens Pfr. ii, 24.
Recluziana LeGuill. . ix, 125
Recognitus Montf. . ix, 91
Recondita G.-Aust. ii, 60.
Recondita West. iv, 220 ; ix, 332
Recordera Parr. . . ix, 301
Rectangula Pfr. iii, 73 ; ix, 6
Rectilabrum Smith, . ix, 343
Redfieldiana C. B. Ad. ix, 89
Redfieldi Pfr. iv, 49 ; . ix, 205
Redempta Cox, vii, 70 ; ix, 143
Redimita W. G. B. iv, 74 ;
 [ix, 200
Redtenbacheri Zel. iii, 189 ;
 [ix, 272
Reedei Braz. ii, 181.
Reeftonensis Sut. viii, 102 ;
 [ix, 33
Reesmanni Cless. . . ix, 266
Reeveana Pfr. vi, 233 ; ix, 109
Reevei Pfr. . . ix, 227
Reevii Brod. . . ix, 227
Reflexiuscula Pfr. vii, 89.
Refuga Gld. iii, 164 ; . ix, 145
Regalis Pfr. ii, 19.
Regeliana Mts. . . ix, 267
Reginæ Brod. vii, 116 ; ix, 219
Regius Lob. i, 62.
Regularis Pfr. iii, 37 ; . ix, 9
Regularis Roth. . . ix, 260
Regulata Bens. ii, 96.
Rehbeini Pfr. vii, 190 ; ix, 225
Rehsei Mart. vi, 261 ; . ix, 120
Reinæ Ben. iii, 187 ; . ix, 274
Reinga Gray, vi, 185 ; . ix, 136
Reinhardi Mörch. ii, 47.
Reiseri Branc. . . ix, 301
Reitteri Bttg. ii, 142.
Rejecta Pfr. ii, 123.
Remissa Parr. . . ix, 263
Remondii Gabb. . . ix, 199
Rémondi Tryon, . . ix, 200
Remoratrix Morl. viii, 274 ;
 [ix, 124
Remota Bens. ii, 145.

- Renaltiana* Hde. vi, 307; ix, 214
Renati Dautz, . . . ix, 259
Reneana Anc. iii, 251.
Renei Fag. iv, 104; . ix, 257
Renitens Morel. ii, 80.
Renoufi Serv. . . ix, 252
Repanda Möll. viii, 123; ix, 4
Repanda Pfr. iv, 59.
Repellini Charp. iv, 118; ix, 307
Repercussa Gld. . . ix, 145
Requieni Bgt. iv, 17.
Requieni Moq. . . ix, 254
Rerayana Mss. iv, 145; ix, 325
Reserata Hde. iii, 166; ix, 146
Resiliens Beck, i, 174.
Resinula G.-Aust. ii, 64.
Resplendens Nevill. i, 180.
Resplendens Phil. ii, 91.
Resmanni West. ii, 150.
Restricta Pfr. . . ix, 215
Retardata Cox, ii, 170.
Retepora Cox, iii, 34; . ix, 34
Reteporoides Tate, viii, 110;
. [ix, 34
Retexta Sh. iii, 44; . ix, 47
Reticulata Bttg. ii, 193.
Reticulata Pfr. . . ix, 199
Retifera Pfr. iii, 161; . ix, 146
Retinella Shutt. ii, 12.
Retirugis Mke. . . ix, 318
Retisculpta Mts. viii, 152;
. [ix, 39
Retowskii Cless. iii, 252; ix, 260
Retrodens Mouss. iv, 166;
. [ix, 327
Retrorsa Gld. ii, 16.
Retunsa Pse. iii, 71; . ix, 24
Retusa Pfr. vii, 157; . ix, 223
Revelata Fér. iii, 180; . ix, 274
Revelierii Deb. iv, 112; ix, 305
Revoluta Pfr., . . ix, 145
Rhætica Mouss. iv, 94; ix, 303
RHAGADA Albers, . ix, 135
Rhaphiellus Mart. i, 177.
Rhea Pfr. ii, 30.
Rhenana Hartm. iv, 117.
Rhenana Kob. . . ix, 322

- Riisei* Pfr. v, 16; . ix, 186
Rimicola Bens. ii, 55.
Rimosa C. & J. . ix, 234
Rimula Lowe, . ix, 241
Rinkii Mörch. ii, 124.
Ripacurcia Bofill, . ix, 251
Riparia Bl. . ix, 266
Ripochi Mab. iv, 155; ix, 327
Riprochi, error for *ripochi*.
Ripularum Lessona, . ix, 273
Rissoana Pfr. iii, 195; . ix, 272
Ritchieana Pils. v, 138; ix, 94
Rivolii Desh. iii, 156; . ix, 148
Rivularis Kr. iii, 107; . ix, 38
Rivularis Mts. . ix, 44
Rizze Arad. . ix, 266
Roberti Aust. ii, 99.
Robillardi Ang. vi, 32; ix, 157
Robiniana Bgt. . ix, 251
Roblini Pett. iii, 169; . ix, 34
Robusta Woll. . ix, 241
Robustus Gld. i, 169.
Rochebrunei Mab. ii, 160.
Rockhamptonensis Cox, vi,
 [159; ix, 134
Rodriguezensis Cr. ii, 26; ix, 38
Roebeleni Mlldff. . ix, 225
Roemeri Pfr. iii, 152; . ix, 77
Rohdei Dohrn, viii, 273; ix, 120
Roissyana Fér. vii, 151; ix, 223
Rojasi Jouss. viii, 112; ix, 57
Rokniaca Bgt. iii, 198; ix, 255
Rollandi Bern. i, 62.
Rollei Malz. viii, 236; . ix, 331
Rollsiana Smith, vii, 63; ix, 142
Romagnolii Dut. . ix, 305
Romalea Bgt. . ix, 326
Romana Fag. . ix, 257
Romblonensis Pfr. . ix, 228
Romulina Serv. . ix, 257
Roperi Pils. viii, 154; . ix, 76
Rorida Bens. ii, 124.
Rosacea Müll. iii, 213; ix, 173
Rosacca Sowb. ii, 70.
Rosai Silv. . ix, 275
Rosalie Ben. iv, 209; . ix, 330
Rosalia Risso, . ix, 283
Rosamonda Bens. ii, 37.
Rosarium Pfr. v, 188; . ix, 166
Roschiti Kim. . ix, 300
Roseolabiata Nev. vi, 82; ix, 154
Roseolabiata Rm. . ix, 322
Roseolabiata Smith, . ix, 142
Roseolimbata Mlldff. . ix, 228
Roseotincta Fbs. . ix, 274
Roseri Kr. iii, 108.
Roseti Pfr., . ix, 258
Rosetti W. & B. . ix, 258
Rossiana Gray, . ix, 223
Rossiteriana Crosse, i, 114;
 [ix, 20
Rossiteri Ang. vii, 109; ix, 220
Rossmessleri Cless. iv, 107;
 [ix, 301
Rossmässleri Pfr. iv, 96; ix, 302
Rössmässleri West. ii, 147.
Rostrata Pfr. v, 126; . ix, 93
Rostrella Pfr. vii, 83; . ix, 170
Rotabilis Rve.=Muhlfeldtiana
 [Pfr., ix, 159
Rota Sowb. vi, 225; . ix, 108
Rotatoria Busch, iv, 54; ix, 209
Rotella Brazier, . ix, 34
Rotellina Pse. iii, 60; . ix, 27
Rothi Pfr. iii, 197; . ix, 266
ROTULA Alb. ii, 5, 22.
Rotula Hombr. iii, 67; ix, 35
Rotula Lowe, iv, 46; . ix, 241
Rotula Q. & M. . ix, 340
ROTULARIA Mch. ii, 6, 47.
Rotundata Morel. . ix, 341
Rotundata Mouss. viii, 261;
 [ix, 173
Rotundata Müll. iii, 19; ix, 47
Rotundata Semp. ii, 47.
Rouvieriana Bgt. iii, 255;
 [ix, 260
Rowellii Newc. iv, 72; . ix, 199
Rozeti Mich. iii, 254; . ix, 260
Rozetopsis L. & B. . ix, 260
Rubella Risso, . ix, 265
Rubellocincta Blanf. ii, 78.
Rubens Hartm. viii, 129; ix, 5
Rubens Mlldff. . ix, 224
Rubens Mts. iii, 205; . ix, 205
Rubescens Dh. ii, 80.

- Rubicunda* Pfr. ii, 35.
Rubiginosa Gld. iii, 59; ix, 27
Rubiginosa Schm. iii, 178; [ix, 274
Rubra Alb. vi, 260; . ix, 120
Rubra Chier. . . ix, 272
Rubricata Gld. ii, 77.
Rubroflava Chier. ii, 155.
Rudens Hde. . . ix, 171
Ruderata Stud. iii, 20; . ix, 47
Rudis Grt. iii, 39; . ix, 35
Rudis Mühlf. iv, 118; . ix, 307
Rudiuscula Pfr. iii, 93; . ix, 6
Rufa DeK. . . ix, 76
Rufa Mlldff. viii, 133; . ix, 4
Rufa Pfr. ii, 22.
Rufescens Grat. ii, 77.
Rufescens Penn. iii, 175; ix, 274
Rufescens Pfr. i, 174.
Rufescens Plat. iii, 191.
Rufescens Schrenk. . ix, 224
Ruficincta Newc. iv, 72; ix, 200
Rufilabris Jeffr. . . ix, 266
Rufina Jay, ii, 21.
Rufispira Mts. iii, 204; . ix, 267
Rufoplicata Poey, v, 36; ix, 185
Rufofasciata Braz. vi, 146; [ix, 131
Rufofilosa Bock, vii, 84; ix, 170
Rufogastra Less, vii, 207; ix, 227
Rufolabris Ben. iii, 233; ix, 250
Rufotincta Gass. i, 120.
Rufozonata Ad. ii, 25.
Rufozonata Mart. . ix, 192
Rufula Pfr. iii, 99; . ix, 58
Ruga Cox, iii, 264.
Ruga Godw.-Aust. ii, 65.
Rugata Brus. . ix, 301
Rugata Mart. ii, 36.
Rugata Pse. iii, 67; . ix, 25
Rugeli Shuttlw. iii, 147ix,
Rugeli W. G. Binn. ii, 184.
Rugellosa Hartm. . ix, 254
Rugifera Dohrn. v, 195; ix, 167
Ruginosa Fér. iv, 63; . ix, 116
Rugosa Ant. . . ix, 320
Rugosa Chem. . . ix, 259
Rugosa Hemph. viii, 117; ix, 50
Rugosa Kob. . . ix, 325
Rugosa Mühlf. . . ix, 318
Rugosa Ziegl. iv, 205; . ix, 331
Rugosiuscula Mich. iv, 11; [ix, 255
Rugosiuscula Mich. . ix, 263
Ruida (B.) Cout. . . ix, 255
Ruida Gld. . . ix, 76
Rumelica Mouss. iv, 240; [ix, 319
Rumelica Z; . . ix, 301
Rumphii Busch. ii, 20.
Rupestris Dr. iii, 51; . ix, 44
Rupicola (Bl.) West. . ix, 319
Rupicola Mlldff. ii, 67.
Rupicola Stab. . . ix, 44
Ruppelli Dh. iii, 210; . ix, 205
Rurutuensis Grt. iii, 61; ix, 27
Rusicadensis Let. viii, 188; [ix, 272
Rüsii Pfr., error for Rüsei, *g. v.*
Rusinica Bgt. . . ix, 267
Russelli Braz. ii, 179.
Russeola Morel. i, 177.
Russeola Morel. ii, 97.
Rustica Hartm. iv, 237; ix, 319
Rustica Mouss. vii, 187; ix, 225
Rustica Pfr. ii, 212.
Rustica Suter, . . ix, 338
Rusticula Aust. ii, 99.
Rusticula Gass. iii, 26; . ix, 33
Rusticula Pal. iv, 14; . ix, 255
Rutilans Z. . . ix, 278
Rypa Let. & Bgt. iii, 185.
Ryparia Bgt. . . ix, 319
Ryssolemma Gray, ii, 15.
Ryssota Alb., orig. orthogr. for *Rhysota*.
Sabæa Boiss. . . ix, 248
Sabæa Mart. viii, 133.
Sabatieri Kob. viii, 165.
Sabiniana Mab. iv, 154; ix, 327
Sabuletorum Bens. iii, 107; [ix, 38
Sabulivaga Mab. . . ix, 253
Sabulosa Haz. iv, 237; . ix, 319
Sabulosa Zgl. . . ix, 263

- Saburra Gass. ii, 181. . ix, 33
 Saccata Pfr. ii, 19.
Saccharata Lwe. . . ix, 243
 Sachalensis Pfr. vii, 67; ix, 143
 Sadleriana Zieg. iv, 89; ix, 302
 SAGDA Beck, . . ix, 58
 SAGDINÆ, . . ix, xxxii
 SAGDINELLA Mch. ii, 9, 126.
Sagemon Beck, . . ix, 93
 Sageti Bgt. . . ix, 260
Sagittifera Pfr. ii, 29.
 Sagraiana Orb. v, 50; . ix, 180
 Saharica Bgt. . . ix, 257
 Saharica Deb. viii, 56; . ix, 234
 Saharica Kob. iv, 128; . ix, 324
Saidana Deb. . . ix, 324
 Saigonensis Crse. iii, 84; ix, 4
Saissetia Bayle, . . ix, 342
 Saisseti Montr. i, 117; . ix, 54
 Sakalava Ang. vi, 26; . ix, 156
 Salangana Mart. ii, 217.
 Salassia Poll. . . ix, 275
 Salaunica Fag. . . ix, 252
 Salaziensis Nev. ii, 176.
 Saldubensis Serv. . . ix, 256
 Salebrosa Lwe. iv, 44; . ix, 243
Salemensis L. & B. . . ix, 336
Salentina Bl. . . ix, 249
 Salius Bens. i, 181.
 Salivosa Bgt. . . ix, 256
 Salleana Pfr. . . ix, 190
Salmonaceus Hemph. W. G.
 [B. ix, 52
Salmonensis Hemph. . ix, 52
Salmonensis Tryon, iii, 146;
 [ix, 76
Salmurina Serv. iii, 181; ix, 274
 Salomonis LeGuill, ii, 87.
 Salvane Fag. . . ix, 257
 Salvatoris Pfr. v, 19; . ix, 186
 Salvini (Strobila) Tristr. iv, 77.
Samarensis Hid. . . ix, 223
Samarensis Pfr. . . ix, 109
Samarensis Semp. vii, 146;
 [ix, 222
 Samboanga H. & J. vii, 124;
 [ix, 219
 Samnitum West, . . ix, 256
 Samoa H. & J. iii, 81; ix, 6
 Samoensis Bd. ii, 119.
 Samoensis Mouss. ii, 180.
 Sampoli Bgt. . . ix, 325
 Sampsoni Weth. viii, 152;
 [ix, 73
 Samsunensis Zel. . . ix, 267
 Samuiana Mldff. . . ix, 124
 Sanburni W. G. Binn. iii,
 [145; ix, 342
 Sancta Bgt. ii, 156.
 Sanctæannæ Sm. iii, 89; ix, 5
 Sanctæluce Smith, v, 198;
 [ix, 97
 Sandai Kob. . . ix, 214
 Sandwicensis Pfr. ii, 213.
 Sanis Bens. iii, 84; . ix, 4
 Sannio Pfr. ii, 18.
 Sansitus Cox, iii, 81; . ix, 6
 Santacruzensis Pfr. v, 23;
 [ix, 186
 Santanaensis Pfr. ii, 165.
 Santorina Let. iii, 250.
 Sanziana H. & J. vi, 272; ix, 212
 Saporuana Bttg. viii, 113.
 Sapeca Heude. . . ix, 4
 Saponacea Lwe. iv, 183; ix, 328
 Saporosa Mab. . . ix, 275
 Sappho Braz. ii, 215.
 Saracena Ben. . . ix, 331
 Saranganica Hid. vi, 230;
 [ix, 109
 Saranganica Mldff. viii, 245;
 [ix, 220
 Sarawakana Dohrn. ii, 21.
 Sarcinosa Fér. vii, 195; ix, 227
 Sarcocheila Mörch. v, 121;
 [ix, 93
 Sarcochroa Pils. vi, t. 68, f.
 [85; ix, 108
 Sarcodes Rve. ii, 105.
 Sarcostoma W. & B., iv, 152;
 [ix, 327
Sarda Kob. . . ix, 234
 Sardalabiata Cox, vi, 171;
 [ix, 134
 Sardiniensis Villa. viii, 164;
 [ix, 255

- | | | | |
|----------------------------------|---------------|-----------------------------------|-----------|
| Sardoa Malz. viii, 55 ; | . ix, 319 | <i>Scalaris</i> Müll. | . ix, 319 |
| Sardoa Ziegl. iii, 224 ; | . ix, 336 | Scalatella Mlldff. viii, 199 ; | |
| Sardonian v. Mts. viii, 236 ; | | | [ix, 280 |
| | [ix, 330 | Scalena Mart. v. 143 ; | . ix, 94 |
| Sarelii Mts. iv, 49 ; | . ix, 205 | <i>Scalpta</i> Grt. ii, 115. | |
| Sargentiana J. & P., viii, 153 ; | | Scalpta Mts. ii, 22. | |
| | [ix, 77 | Scalprum Val. ii, 27. | |
| Sargenti Bld. v, 18 : | . ix, 186 | Scalpturita Bens. iii, 211 ; | |
| <i>Sargenti</i> J. & P. | . ix, 77 | | [ix, 205 |
| Sargi C. & F. iv, 80 ; | . ix, 199 | Scandens Cox, ii, 179. | |
| Sarinica Bgt. | . ix, 275 | <i>Scarburgensis</i> Alder, | . ix, 281 |
| Sarriensis Pena, iii, 193 ; | ix, 266 | Scenoma Bens. vii, 83 ; | . ix, 170 |
| Sata Aust. ii, 100. | | Scepasma Pfr. iv, 58 ; | . ix, 209 |
| Sativa Z. | . ix, 320 | Schadenbergi Mlldff. vii, 160 ; | |
| <i>Satsuma</i> A. Ad. | . ix, 168 | | [ix, 224 |
| Saturnia Gld. vi, 203 ; | . ix, 104 | Schadenbergi Mlldff. viii, 223 ; | |
| Saturni Cox, iii, 24 ; | . ix, 34 | | [ix, 205 |
| Satyrus Brod. viii, 13 ; | . ix, 228 | Schaerfiae Pfr. vi, 43. | |
| Sauleyi Orb. iv, 164 ; | . ix, 327 | <i>Schahbulakensis</i> Bgt. | . ix, 320 |
| Sauliae Pfr. = palumba Souv., | | Schamhalensis Rosen. | . ix, 284 |
| which becomes a syn. | ix, 104 | Schaufussi Kob. iv, 110 ; | ix, 255 |
| Sauvallei Arango. v. 37 ; | ix, 185 | Scheepmakeri Pfr. vi, 282 ; | |
| Savadiensis Nev. | . ix, 209 | | [ix, 111 |
| Savesi Gass. ii, 168. | | Schembrii Scac. iv, 28 ; | . ix, 263 |
| <i>Savesi</i> Pett. iii, 46 ; | . ix, 13, 338 | Schensiensis Hilb. viii, 211 ; | |
| <i>Savignyana</i> Ehrenb. | . ix, 300 | | [ix, 206 |
| Savinella Serv. | . ix, 273 | Scherzeri Zel. iv, 212. | . ix, 332 |
| Saxatilis Couth. ii, 164. | | Schistoptychia Mlldff. iii, 165 ; | |
| Saxatilis Hm. | . ix, 44 | | [ix, 146 |
| Saxetana Paul. iv, 224 ; | . ix, 331 | Schistostelis Bens. ii, 110. | |
| <i>Saxicola</i> Gld. | . ix, 58 | Schlæfii Mouss. iv, 241 ; | ix, 319 |
| <i>Saxicola</i> Pfr. ii, 202. | | Schlærotricha Bgt. iv, 96 ; | |
| Saxipotens Woll. | . ix, 240 | | [ix, 302 |
| Saxivaga Malz. | . ix, 274 | Schlumbergeri Morl. iii, 166 ; | |
| Saxoniana Sterki, viii, 259 ; | | | [ix, 146 |
| | [ix, 284 | Schmackeriana Mlldff. ii, 120. | |
| <i>Sayana</i> Alb.-Martens, | . ix, 64 | Schmackeri Mlldff. vi, 307 ; | |
| Sayii Binn. iii, 155 ; | . ix, 76 | | [ix, 214 |
| <i>Sayii</i> Wood, DeKay, | . ix, 73 | Schmackeri Mlldff. | . ix, 337 |
| <i>Scabra</i> Lam. | . ix, 50 | Schmeltziana Mss. ii, 47. | |
| <i>Scabra</i> Wood, | . ix, 293 | Schmidti Zgl. iv, 103 ; | . ix, 302 |
| <i>Scabrella</i> Mke. | . ix, 91 | <i>Schombrii</i> , | . ix, 263 |
| Scabricula Ad. iv, 59. | | Schomburgiana Mlldff. | . ix, 170 |
| Scabriuacula Dh. iv, 203 ; | ix, 330 | Schotti (Zel.) Pfr. | . ix, 267 |
| <i>Scabrosa</i> Fé. | . ix, 109 | Schrenki Midd. iii, 200 ; | ix, 267 |
| <i>Scabrosa</i> Poey, v, 61 ; | . ix, 97 | Schreteriana Pfr. v, 108 ; | ix, 89 |
| Scævola Mts. vi, 306 ; | . ix, 169 | <i>Schreteriana</i> Rv. | . ix, 90 |
| <i>Scalariformis</i> Ben. | . ix, 330 | Schuberti Roth, iii, 195 ; | ix, 272 |

- Schumacheriana* Pfr. ii, 43.
Schwartziana Pfr. v, 125; ix, 93
Schwerzenbachiana Calc. ix, 8
Sciadium Pfr. ix, 9
Sciadophila Hde. ii, 217.
Sciara West, ix, 303
Sciaphila Hagenm. ix, 305
Scintilla Lwe. ii, 160.
Scioana Poll. viii, 190; ix, 268
Sciraia Bgt. ix, 275
Scissa Paul, ix, 259
Scitula C. & J., iv, 29; ix, 262
Sclerostoma Rv. ix, 167
Sclerostoma Stef. ix, 252
Sclerotricha Auct. ix, 302
Scorpio Gld. ii, 68.
Scotina Mab. vi, 46; ix, 157
Scotophila Stef. ii, 151.
Scotti Cox, vi, 133; ix, 131
Scrobiculata Gredl. ii, 170.
Scrobiculata Lwe. ix, 293
Scrobiculata Pfr. vi, 224; ix, 108
Serupea Bgt. ix, 256
Serupellina Fag. iv, 18.
Serupulus Cox, iii, 46; ix, 14
Sculpta Mldff. ii, 67.
SCULPTARIA Pfr. ix, 39
Sculpticarina Marts. iii, 80; [ix, 5
Sculptilis Bld. ii, 161.
Sculptilis Möll. vi, 12; ix, 290
Sculptilis Pse. not Bld. iii, [70; ix, 24
Sculpturata Gray, iii, 138; [ix, 39
Scuta Pse. ix, 6
Scutella Bens. i, 176.
Scutellata West. ix, 302
Scutula Shuttlw. ix, 341
Scytodes Pfr. iii, 77; ix, 5
Sebacea Pfr. ix, 5
Seberti Marie. i, 252.
Sebinensis Kob. ix, 303
Sebkorum Deb. viii, 167; ix, 249
Secernanda Mab. ii, 138.
Secernenda Rm. iv, 242; ix, 319
Seckendorffiana Pfr. viii, 7; [ix, 228
Secreta Bgt. ii, 141.
Secunda DaCost. ix, 318
Secundaria Hde. ix, 210
Secura Hde., ix, 146
Securiformis Dh. iii, 78; ix, 6
Securiformis Mouss. ii, 41.
Sedentaria Bgt. ii, 145.
Sedentaria Hde. ix, 209
Seetzeni Koch. iii, 223; ix, 248
Segalaunica Sayn. ix, 319
Segestana Ph. iv, 203; ix, 330
Segetum Fag. ix, 256
Segregata Sut. ix, 33
Seguiniana Hde. ix, 214
Segusina Less. iii, 179; ix, 275
Seguyana Péch. ix, 307
Seignetti Bgt. ix, 326
Seirensis Fag. ix, 257
Sekingeriana Hde. ii, 122.
Selecta Klika, n. n. for *globula* Kryn. not Müll.
Selecta Mouss. ii, 149, 193.
Selectus Mouss. ii, 149, 193.
Selenina Gld. ix, 58
SELENITES Fisch. ii, 13, 205.
SELENITIDÆ Fisch. ix, xxviii.
Selenkai Pfr. ii, 183.
Selenostoma Pfr. v, 193; ix, 167
Selinuntina Ph. iv, 203; ix, 330
Selkirkii Sm. iii, 47; ix, 41
Sellersi Cox, vii, 51; ix, 140
Selskii Gerst. iv, 47; ix, 205
Semenlini Moric. ii, 175.
Semenovi Mart. ix, 205
Semenowi Mart. iii, 237; ix, 267
Semiaperta Mart. v, 125; ix, 93
Semibadia Alb. ix, 132
Semicastanea Pfr. vi, 126; [ix, 132
Semicerina Morel. ii, 22.
Semiclathrata West. ix, 302
Semiclause Mts. iv, 80; ix, 198
Semiconvexa Pfr. iii, 88; ix, 5
Semicornu Klein, ix, 117
Semicostulata Beck. ii, 158.
Semidecussata Pfr. ii, 43.
Semifusca Dh. ii, 22.
Semiglobosa Pfr. ii, 43.

- Seminigranosa* Sowb. ii, 44.
Semihispida Anc. iii, 185.
Seminimembraneus Mts. i, 184.
Seminigra Morel. vi, 162;
[ix, 134]
Seminium Morel. ii, 176.
Semiuula Chier. ii, 144.
Semivolum Rossm. . ix, 281
Semipartita Desh. ii, 84.
Semipicta Hid. iv, 16; . ix, 255
Semiplicata Pfr. iii, 44; ix, 51
Semirasa Mouss. vi, 295; ix, 113
Semirufa Alb. viii, 245; ix, 222
Semirugata Beck. ii, 81.
Semirugosa Kob. viii, 188;
[ix, 272]
Semisculpta Mart. ii, 82.
Semisculpta Mouss. ii, 194.
Semitecta Hartm. . ix, 244
Semitecta Mouss. iv, 181; ix, 328
Semperi Dör. i, 66.
Semperi Mlldff. . ix, 223
Sempriniana Hde. viii, 207;
[ix, 206]
Senckenbergiana Kob. vi,
[102; ix, 214]
Seuckendorffiana error for secken-
dorffiana Pfr. . ix, 228
Sendtneri Cless. . ix, 307
Senegalensis Fér. . ix, 103
Senilis Morel. iv, 140; ix, 325
Separanda Zgl. iii, 174.
Separica Bgt. . ix, 267
Septemgyrata Mss. iii, 201;
[ix, 267]
Septemvolva Say, . ix, 73
Septentrionalis Bgt. ii, 149.
Septentrionalis Cless. . ix, 307
Septentrionalis Cl. . ix, 274
Septeutritionalis Sm. . ix, 143
Sepulchralis Fér. vi, 18, 301;
[ix, 156]
Sepulchralis Rv., . ix, 156
Sequax Bens. ii, 96.
Sequentiana Ben. iv, 30; ix, 262
Sequoicola Coop. iv, 71; ix, 199
Seraphinica Heude, vi, 199;
[ix, 104]
- Serbica* Mlldff. iv, 88; . ix, 300
Serena Cox, iii, 77; . ix, 5
Seriatseta Roch. vi, 268; ix, 124
Serica G.-Aust. iii, 159; ix, 146
Sericata Sut. viii, 64; ix, 9
Sericatula Pfeiffer, ii, 208;
[ix, 34]
Sericea Drap. iii, 178; . ix, 274
Sericea Schrenk. . ix, 275
Sericella Serv. . ix, 275
Sericeus Mts. i, 178.
Sericina Bttg. viii, 114.
Sericina Mlldff. . ix, 337
Serotina Ad. vi, 106; . ix, 205
Serpens Martyn. v, 178; ix, 166
Serpens Spix, = feisthameli.
Serpentina Fér. iv, 214; ix, 331
Serpentinula Sut. viii, 103;
[ix, 33, 339]
Serpentulus Adams, . ix, 92
Sepestes Hde. . ix, 210
Serrata H. Ad. iii, 87.
Serrula Bens. ii, 23.
Serrula Morel. . ix, 260
Serrulata Bk. iv, 25; . ix, 261
Serta Alb. iv, 193; . ix, 294
Servaini Bgt. iii, 31; . ix, 45
Serrilis Shutt. . ix, 45
SESSARA Alb. ii, 9, 131.
Sesteri Gall. . ix, 333
Setabulensis error for setubalensis
[Pfr. iii, 256; ix, 260]
Setigera Gld. . ix, 27
Setigera Sowb. ii, 86.
Setigera Zgl. iv, 100; . ix, 300
Setiliris Bens. ii, 133.
Setipila Benoit, . ix, 302
Setipila Zgl. . ix, 301
Setocincta A. Ad. iv, 59.
Setosa Costa, . ix, 301
Setosa Zgl. iv, 97; . ix, 302
Setubalensis Pfr. iii, 256; ix, 260
Setulosa Brig. iv, 90; . ix, 301
Sexdentata Smith, . ix, 339
Sexlamellata Pfr. iii, 63; ix, 27
Servolla Parr. ii, 137.
Sevillensis Serv. . ix, 324
Sevillianiana Grat. . ix, 324

- Sganziniana C. & F. vi, 301;
 [ix, 156
 Shanensis Aust. ii, 129.
 Shanensis Stol. iii, 162; ix, 146
 Shanghaiensis Pfr. iv, 56;
 [ix, 209
 Shanica Bedd. viii, 275; ix, 124
Schaufussi=*schaufussi*.
 Shavi Smith, vi, 34; . ix, 157
Sheldonia Ane. viii, 135.
 Shengorensis Aust. ii, 100.
 Sheridani Braz. i, 124.
 Shermani Pfr. iii, 84; . ix, 4
 Shiplayi Pfr. ii, 130.
 Shiroensis G.-Aust. iii, 163;
 [ix, 145
 Shisha Aust. ii, 112.
Shuttleworthi Serv. . ix, 341
 Siamensis Haines, i, 179.
 Siamensis Pfr. ii, 86.
Siberica Friv. . ix, 267
 Sibutuensis Sm. . ix, 124
 Sibuyanica Hid. viii, 121; ix, 4
 Sibylla Tap.-Can. ii, 219.
 Sicana Fér. iv, 213; . ix, 330
 Sicanoides Kob. iv, 213; ix, 330
 Sicula Ben. iv, 219; . ix, 331
 Sicula Braz. vii, 45; . ix, 142
 Sicula Rossm. ii, 156.
Siculina Zgl. . ix, 302
 Siderensis Malz. viii, 181;
 [ix, 260
Siderites Friv. . ix, 260
 Sieboldtiana Pfr. iv, 47; ix, 205
 Sieversi Bttg. ii, 155.
 Sieversi Mart. viii, 263; ix, 95
Sigarellina Charp. . ix, 336
 Sigela Bgt. . ix, 302
 Sigensis Kob. iii, 256; . ix, 260
Sigma Pfr. . ix, 13
 Sigmoides Morel. iii, 101; ix, 57
 Signata Fér. iv, 223; . ix, 332
 Significans Bld. ii, 198.
 Sigurensis G.-Aust. ii, 62.
 Sikkimensis Nev. ii, 64.
 Sikrigaliensis Nev. ii, 97.
 Silanica Bgt. . ix, 272
 Silenus Angas, vi, 254; ix, 120
 Siliens Cox, . ix, 34
 Silveri Angas, vi, 191; . ix, 129
 Silvestrii Caffei, iv, 226; ix, 332
 Silvestris West. . ix, 300
Simia Fér. . ix, 293
 Simiarum Kob. . ix, 256
 Similaris Fér. iii, 205; . ix, 205
 Similis C. B. Ad. iii, 9; ix, 64
 Similis Cox, . ix, 34
 Similis Semp. ii, 110.
 Simillima Pse. ii, 114.
Simocheila Bgt. . ix, 324
 Simodæ Jay, vi, 95; . ix, 213
 Simoniana Bgt. iii, 31; ix, 45
 Simoni Bttg. ii, 193.
 Simplex Jonas, viii, 33; ix, 229
 Simplex Lam. ii, 21.
Simplicaria Mouss. . ix, 31
 Simplicilabris Ane. ii, 207.
 Simplicata Parr. iii, 194; ix, 265
 Simplicula Morel. ii, 152.
 Simson Pfr. v, 116; . ix, 90
 Simulans Ad. ii, 174.
 Simulata Fér. iii, 232; . ix, 249
 Sinaica Mart. viii, 178; ix, 248
 Sinapidium Reinh. ii, 177.
 Sincera C. B. Ad. iii, 99; ix, 58
 Sinclairi Pfr. i, 121.
 Sinensis Hde. ii, 103.
 Singularis Pfr., see *Bulinulidæ*.
 Sinica Mlldff. ii, 126.
Sinica Mts. . ix, 205
 Sinicus Mart. i, 179.
 Siningfuensis Hilb. viii, 211;
 [ix, 206
 Sinistrorsa Desh., *Bulinulidæ*.
Sinistrorsa Möll. . ix, 214
 Sinistrorsum Tayl. . ix, 307
Sinuata Deless. . ix, 90
 Sinuata Müll. v, 114; . ix, 90
 Sinulabris Mart. ii, 171.
 Sinuosa Fér. v, 115, . ix, 90
 Siphnica Kob. . ix, 260
 SIPHONADENIA, . ix, 235
 Sipunculata Forbes, v, 162;
 [ix, 95
 Siquijorensis Brod. vii, 159;
 [ix, 223

- Siquijorensis* Pfr. . . ix, 228
Siquijorica Mhlff. vii, 125; [ix, 220
Sirena Beck, vii, 98; . ix, 215
Sisparica Blf. ii, 38.
SITALA Ad. ii, 7, 52.
Siticolosa Fag. . . ix, 256
Sitifensis Bgt. viii, 165; ix, 249
Sitiens Cox, . . ix, 338
Sivalensis Hutt. ii, 61.
Sivella Blanford, . . ix, 1
Skiaphila Orb. i, 63.
Skinneri Reeve, vi, 84; ix, 154
Sloaneana Shuttl. v, 111; ix, 90
Slouguia L. & B. . . ix, 251
Smaragdina Grat. . . ix, 219
Smaragdina Rve. viii, 37; [ix, 229
Smaragdulus Bk. i, 174.
Smaragdus Beck, . . ix, 225
Smithiana Pfr. ii, 164.
Smithii Bock, iv, 57; . ix, 116
Smithi Suter, . . ix, 338
Smiruensis Mouss. iii, 184.
Smyrnensis Roth. ii, 136.
Sobara Bgt. . . ix, 266
Sobrina Fér. v, 80; . ix, 98
Soccaliana Let. . . ix, 300
Socia Rm. iv, 248; . ix, 320
Socia Sowb. . . ix, 33
Societatus Mouss., Schm. ix, 26
Sogdianus Mts. i, 175.
Solaciaca Mab. viii, 159; ix, 255
Solanoi Serv. . . ix, 256
Solaria Mke. iii, 43; . ix, 47
Solarium Spix, . . ix, 166
Solarium Q. & G. iii, 80; ix, 5
Solarium Risso, . . ix, 262
Solaroides Rv. iii, 85; . ix, 4
SOLAROPSIS Beck, . . ix, 166
Solata Bens. ii, 80.
Soleilleti Bgt., iii, 260; . ix, 260
Solida Pfr. vii, 153; . ix, 223
Solida Pfr. viii, 8; . ix, 228
Solida Ziegl. . . ix, 320
Solidior Kob. . . ix, 304
Solidiusecula Sm. ii, 111.
Solidula Crosse, i, 114.
Solidula Pfr. ii, 23.
Solidus G.-A. i, 180.
Solitaria Haz. iv, 237; . ix, 319
Solitaria Pfr. . . ix, 264
Solitaria Poir. . . ix, 254
Solitaria Say, iii, 58; . ix, 50
Solitudinis Bgt. iii, 198.
Solivaga Rve. viii, 9; . ix, 228
Sollieri Bgt. . . ix, 330
Solorensis v. Mts. vi, 190; [ix, 136
Soluta Mich. . . ix, 324
Soluta Rve. ii, 80.
Soluta Zgl. . . ix, 330
Somersetensis M. & P. viii, [295; ix, 38
Souamargensis Ney. ii, 121.
Sonorensis Coop. . . ix, 52
Sophie Gaskoin, ii, 83.
SOPHINA Bens. ii, 8, 109.
Sordida Pfr. iv, 65; . ix, 116
Sordulenta Morel. iii, 177; [ix, 275
Sorella Mouss. ii, 141.
Sororecula Ben. iii, 29; . ix, 45
Sororecula v. Mart. vi, 228; [ix, 109
Soror Fér. v, 107; . ix, 89
Sororia Cox, ii, 123.
Souleyetiana Pfr. ii, 40.
Souverbiana Fisch. vi, 66; [ix, 153
Sowerbyana Pfr. ii, 29.
Spade Cale. . . ix, 252
Spadicea Gm. ii, 17.
Spælla L. & B. . . ix, 263
Spællina L. & B. . . ix, 263
Spaldingi Braz. . . ix, 34
Spanias Nev. . . ix, 322
Sparnacensis Dh. . . ix, 282
Sparsa Mouss. ii, 69.
Specialis Bgt. . . ix, 257
Speciosa Jay, . . ix, 222
Speciosa Pfr. . . ix, 222
Speciosa Ziegl. . . ix, 325
Spectabilis Pfr. ii, 107.
Spectabilis Zgl. . . ix, 263
Spectra Cox, iii, 266; . ix, 34

- Spectrum* Malz. . . ix, 305
Spectrum Rve. . . ix, 142
Speiranomala Bgt. . . ix, 234
Speiratopa Péch. . . ix, 307
Spelæa Hde. ii, 122.
Spelæodiscus Brus. . ix, 46
Spengleriana Pfr. v, 100; ix, 89
Spermata Silva. . . ix, 281
Sphæra Hde. ii, 218.
Sphærica Sowb. vii, 172; ix, 226
Sphæron Sowb. vii, 154; ix, 220
Sphæriostoma Bgt. . ix, 303
Sphærita Hartm., iii, 249; [ix, 249
Sphæroconus Pfr. viii, 200; [ix, 169
Spheroidea Le Guill. . ix, 135
Sphæromorpha Bgt. . ix, 324
SPHÆROSPIRA Mörch. . ix, 132
Sphærule Lwe. iv, 39; . ix, 242
Sphærolata Reinh. . ix, 169
Sphakiota Malz. . . ix, 260
SPHINCTEROCHILA Anc. ix, 234
Sphinctostoma Ad. iii, 218; [ix, 169
Spiceri Pett. . . ix, 34
Spiculosa Shuttl. iii, 7; . ix, 64
Spilmenti Bgt. . . ix, 251
Spinei Cox, vi, 263; . ix, 122
Spinifera Mouss. iii, 54; ix, 281
Spinolæ Villa, iv, 120; . ix, 116
Spinosa Lea, iii, 141; . ix, 78
Spinossissima Semp. vi, 273; [ix, 212
Spinulosa Lightf. . . ix, 281
Spiralis Le Guill. ii, 75.
Spiranomala Bgt. viii, 55; ix, 234
Spiraplana Gredl. ii, 178.
Spirilla West. . . ix, 254
Spirillus Gld. i, 65.
Spirillus Gld. . . ix, 41
Spiriplana Oliv. iv, 226; ix, 333
Spirorbis Dh. i, 66.
Spirorbis Lwe. iv, 41; . ix, 243
SPIRORBULA Lowe, . ix, 240
Spiroxia Bgt. iii, 199; . ix, 268
Spirulata Pfr. iii, 102.
Spirula Villa. . . ix, 44
Spirula Zel. iii, 249; . ix, 252
Spiriana Pfr. i, 61.
Splendens Hid. non Semp. ix, 4
Splendens Hutt. ii, 109.
Splendens Malz. iv, 211; ix, 330
Splendens Semp. viii, 123; [ix, 4
Splendescens Cox, vii, 16; ix, 140
Splendida Drap. iv, 147; ix, 322
Splendidula Ant. . ix, 68
Splendidula Möll. viii, 123; [ix, 4
Splendidula Pfr. i, 129.
Splendidula Ziegl. ii, 150.
Spoliata Cox, iii, 46; . ix, 14
Sportella Gld. ii, 205.
Spratti Pfr. iii, 253; . ix, 260
Spreta C. B. Ad. iii, 98; ix, 58
Spretus Rv. . . ix, 228
Squalida Lwe. iv, 35; . ix, 241
Squalida Ziegl. . . ix, 205
Squammatina Serres, . ix, 301
Squamulifera Mldff. iv, 59.
Squamosa Fér. v, 95; . ix, 180
Squamosella Hde. iii, 221; [ix, 170
Squamulina Gredl. . ix, 170
Squamulosa Mss. iv, 56; ix, 209
Squarrosa Gld. viii, 194; ix, 209
Srimani G.-Aust. ii, 56.
Stabilei Paul. . . ix, 301
Stabilis Sowb. viii, 45; . ix, 231
Stæchadica Bgt. ii, 159.
Staminea Mke. . . ix, 181
Standfesti Pen. . . ix, 300
Stanleyensis Pett. . ix, 34, 338
Starkei Braz. ii, 181.
Staudingeri Anc. viii, 134; [ix, 5
Stauropolitana Schmidt. ix, 322
Stearnsiana Gabb. iv, 119; [ix, 200
Stearnsi Bld. iii, 102; viii, 111.
STEGODERA Martens, . ix, 147
Steiniana Anc. . . ix, 191
Stellaris Lwe. iv, 38; . ix, 241
Stellata Braz. iii, 34; . ix, 34
Stellula Gld. iii, 61; . ix, 27

- Stelzneriana* Ph. iii, 43; ix, 41
Steneligma Bgt. . ix, 275
Stenochila Mldff. iii, 159; [ix, 146
Stenogyra A. Ad. ii, 178.
Stenogyra Mldff. . ix, 4
Stenogyra Pfr. iii, 124; ix, 83
Stenomphala Mke. iv, 88; ix, 300
Stenomphala Mldff. ii, 121.
Stenopsis Moq. . ix, 215
STENOPUS Gldg. ii, 11, 182.
Stenostoma Pfr. v, 48; . ix, 182
Stenostoma Raf. . ix, 69
Stenostrepta Pfr. . ix, 83
Stenotrema Fér. iii, 140; ix, 78
STENOZEMA Raf. . ix, 77
Stenozona Mldff. vi, 119; [ix, 214
Stenozona Mldff. viii, 133; [ix, 5
Stentzii Partsch. . ix, 287
STEPHANODA Albers, . ix, 40
Stephanophora Desh. ii, 205.
Stephensi Cox, iii, 46, 262; [ix, 14, 338
Stephensoniana Braz. . ix, 134
Stephoides Stol. ii, 94.
Stephus Bens. ii, 118.
Stepsanoda Pfr. . ix, 40
Stercolena West.=stereolena [Bgt.
Stereodonta Bgt. . ix, 325
Stereolena Bgt. iii, 229; ix, 251
Sterilis Hde. . ix, 209
Sterkiana Sut. viii, 101; ix, 33
Sterna Alb. . ix, 307
Stendneri Jick. ii, 61.
Steursiana Shutt. vii, 33; ix, 141
Steursii Shutt. ii, 82.
Sticta Bgt. . ix, 326
Stictica West. . ix, 256
Stigmatica Pfr. iii, 100; ix, 58
Stilpna Mab. vi, 53; . ix, 157
Stimpsoni Pfr. iii, 206; ix, 205
Stiparum Rm. iii, 241; ix, 249
Stipulata Rve. iii, 94; . ix, 30
Stiversiana Coop. . ix, 199
Stoddarti Gray, iii, 73.
Stokesi Sm. iii, 262; . ix, 32
Stolephora Val. ii, 29.
Stoliczkana Hilb. . ix, 206
Stoliczkana Nev. iii, 250; ix, 206
Stoliczkanus Nev. i, 175.
Stolidota Q. & M. . ix, 342
Stolliana Mts. . ix, 191
Stolli Mart. . ix, 192
Stoltzmanni Lub. v, 150; ix, 94
Stomatodæa Bgt. . ix, 324
Storiana Mouss. . ix, 124
Stostoma Rv. . ix, 96
Strabo Braz. vii, 60; . ix, 142
Stragulum C. & F. vi, 23, [302; ix, 156
Straminea Alb. . ix, 89
Straminea Brig. iv, 240; ix, 319
Straminea Hde. iii, 207; ix, 205
Straminea Semp. ii, 124.
Straminea Semp. viii, 39; ix, 230
Straminiformis Bgt. . ix, 319
Strangei Pfr. i, 123, 169.
Strangeoides Cox, i, 125.
Strangulata C. B. Ad. v, [112; ix, 90
Strangulata H. & J. . ix, 114
Streatori Pils. viii, 240; ix, 183
Strebeli Pfr. iii, 139.
Streptaxon Rv. . ix, 24
Streptostoma Mldff. . ix, 223
Striata Brard. . ix, 249
Striata Müll. iv, 7; . ix, 255
Striata Semp. . ix, 229
Striatella Anth. iii, 20; ix, 48
Striatella Cless. . ix, 253
Striatissima Dh. iii, 207; ix, 205
Striatissima Pils. vii, 162; [ix, 223
Striatula Bk. . ix, 249
Striatula Fabr. iv, 105.
Striatula Gray, ii, 153.
Striatula Hartm. . ix, 254
Striatula Semp. ii, 35.
STRIATURA Mse. ii, 13, 201.
Strigata Dillw. . ix, 336
Strigata Mldff. . ix, 225
Strigata Mldff. . ix, 227
Strigata Müll. iv, 218; . ix, 331

- Strigatula* Hartm. . ix, 254
Strigella Drap. iii, 202; ix, 267
Strigelloides Poll. viii, 190; [ix, 268
Strigilis Pfr. iii, 85; . ix, 5
Strigosa Gld. viii, 117; ix, 50
Striolata C. Pfr. . ix, 274
Striolata Guild. . ix, 97
Striolata Phil. . ix, 47
Striolata Pse. ii, 124.
Strobiliana Ph. iii, 43; ix, 41
Strobili Less. . ix, 303
Strobila Hutton, . ix, 27
STROBILA Morse, iii, 138.
Strobilodes M. & P. viii, [147; ix, 38
Strobilus Fér. . ix, 182
Strongylodes Pfr. . ix, 50
Stroudensis Cox, iii, 25; ix, 34
Strubelli Bttg. viii, 126; ix, 5
Strubelli Bttg. . ix, 192
Strucki Mz. . ix, 256
Strumosa Pfr. v, 15; ix, 186
Stuartiæ Sowb. ii, 70.
Studeriana Fér. vi, 87; ix, 151
Stulta Mab. iv, 165; . ix, 327
Stumpffi Kob. vi, 35; . ix, 157
Sturmiana Pfr. vi, 317; ix, 37
Stussineri Bttg. . ix, 276
Stutchburyi Pfr. vi, 148; ix, 131
Stuxbergi West. . ix, 275
Stylodon Beck, . ix, 149
Stylodon Pfr. ii, 27.
Stylodon Rv. ii, 24.
STYLODONTA Crist. & Jan. [ix, 149
Styloptycha Pfr. iv, 58; ix, 171
Styriaca Ffld. iv, 119; . ix, 307
Suanetica Bttg. ii, 193.
Suanetica Bttg. . ix, 304
Suarezensis C. & F. vi, 302; [ix, 157
Suavis Gundl. iii, 100; . ix, 58
Subacuta Pfr. v, 100; . ix, 89
Subalbida Poir. . ix, 249
Subalpina Scholtz, . ix, 307
Subangulata Ad. & Ang, ii, 215.
Subangulata Iss. iv, 129; ix, 324
Subangulata Kob. . ix, 326
Subangulata Pfr. ii, 169.
Subantialba Sut. viii, 104; [ix, 33
Subaperta Ancey, . ix, 318
Subapicina Mouss. iv, 6; ix, 255
Subaquila Shutt. iii, 98; ix, 58
Subatra Pils. . ix, 214
Subatra Pils. . ix, 223
Subaurantia Mart. . ix, 192
Subaustriaca Bgt. . ix, 322
Subbadiella Bgt. . ix, 274
Subbrevieri Bgt. . ix, 325
Subbrocheri Pils. v, 55; ix, 189
Subcelata Less. iii, 173; ix, 275
Subcallifera Lwe. . ix, 242
Subcarinata Cless. ii, 140.
Subcarinata Cless. . ix, 274
Subcarinata Hemph. viii, [118; ix, 50
Subcarinata Hemph, . ix, 199
Subcarinata Mke. . ix, 337
Subcarinata Pfr. viii, 19; [ix, 228
Subcariosula Bgt. iii, 13; ix, 234
Subcastanea Pfr. v, 157; ix, 94
Subcavernula Tryon, iii, 70; [ix, 24
Subchinensis Nev. iv, 62; ix, 210
Subchristinæ Anc. . ix, 207
Subcinctula Hde. . ix, 210
Subcicercula Grt. ii, 124.
Subclausa Rm. . ix, 255
Subcoacta Gass. iii, 26; ix, 33
Subconella Mlldff. iv, 258; [ix, 209
Subconica Ad. v, 40; . ix, 183
Subconoidea Pfr. ii, 96.
Subconsanguinea Pils. vi, 30; [ix, 157
Subcornea Pfr. ii, 92.
Subcorpulenta Sm. vi, 251; [ix, 120
Subcostalis Parr. . ix, 301
Subcostulata Bgt. iv, 9; ix, 255
Subcostulata G.-Aust. ii, 62.
Subdædalea Mouss. iii, 64; [ix, 27

- Subdecussata* Pfr. ii, 58.
Subdeflexa Bttg. iv, 102; ix, 303
Subdentata Fér. iii, 226; ix, 337
Subdepressa Braz. . ix, 34
Subechinata Dh. iii, 182; ix, 275
Subeffusa Bttg. ii, 143, 220.
Subelliptica Mouss. v, 139;
 [ix, 94
Suberis Loc. . . ix, 251
Suberrans Mouss. . . ix, 249
Subflava Fér. iv, 105.
Subflava G.-Aust. vii, 85; ix, 170
Subflava Kin. . . ix, 302
Subfulva Gass. ii, 181.
Subfunebri Mab. vi, 55; ix, 158
Subfusca Beck, ii, 105.
Subfusca Gredl. . . ix, 170
Subfusca Poey, . . ix, 184
Subgeminata Mouss. . ix, 337
Subgibbera Mlldff. vi, 200;
 [ix, 101
Subglabra Bgt. ii, 146.
Subglobosa Bgt. . . ix, 44
Subglobosa Binn. . ix, 322
Subglobosa Jeffr. . ix, 274
Subglobosa Mlldff. . ix, 224
Subglobosa Pils. viii, 152;
 [ix, 78
Subglobosus Lea, . . ix, 227
Subgranosa Le Guill, vi, 137;
 [ix, 131
Subgravida Mab. iv, 157; ix, 327
Subgriseola Hde. . . ix, 170
Subhainanensis Pils. vi, 205;
 [ix, 104
Subhispidula Mouss. . ix, 288
Subhorizontalis Mlldff. . ix, 342
Subhyalina Pfr. ii, 166.
Subhydatina Poll. ii, 220.
Subiberica Fag. . . ix, 257
Subincarnata Suter, . ix, 338
Subinflata Mouss. . ix, 248
Subintersecta Bgt. . ix, 256
Subjavanica Mouss. ii, 79.
Subjecta Bens. ii, 88.
Subjoseana Kob. iv, 142; ix, 325
Subkrynckiana Mouss. ix, 250
Sublævis West. iii, 54; ix, 281
Sublaminata Mouss. . ix, 35
Sublecta Malz. iv, 116; ix, 277
Sublesta Bens. ii, 213; ix, 35
Subleucozona Fag. . ix, 278
Sublimbata Bgt. . . ix, 271
Sublirata G.-Aust. ii, 56.
Sublorioliana Pils. vi, 147;
 [ix, 131
Sublucerna Pils. v, 102; ix, 89
Subluteata Serv. . . ix, 249
Submandarina Pils. vi, 122;
 [ix, 214
Submariella Pils. . . ix, 207
Submaritima Desm. . ix, 249
Submarmorata Woll. . ix, 341
Submeridionalis Bgt. iv, 14;
 [ix, 256
Submeris Migh. . . ix, 184
Submissa Desh. iii, 182; ix, 124
Submontana Mab. . ix, 274
Subnana Nev. ii, 60.
Subneglecta Bgt. . . ix, 256
Subnemoralis Nev. . ix, 322
Subnigritella Bedd. viii, 127;
 [ix, 4
Subnimbosa Kob. . ix, 214
Subnitens Bgt. ii, 158.
Subnitens Gass. ii, 167.
Subnitidosa Mouss. ii, 154.
Subnivellina Bgt. iii, 250; ix, 268
Subnumidica Bgt. . ix, 263
Subobstructa Bgt. iii, 196;
 [ix, 267
Subobvolvata Anc. . ix, 287
Subopaca Pfr. ii, 96.
Suborbicula Dohrn, i, 251.
Suborbicularis Mts. iii, 203;
 [ix, 267
Suborecina Fag. . . ix, 257
Subpalliat Pils. . . ix, 77
Subparasitica Hde. . ix, 170
Subperakensis Pils. vii, 82;
 [ix, 170
Subpersonata Midd. iii, 147;
 [ix, 309
Subpisana Bgt. . . ix, 336
Subplana Binn. ii, 185.
Subplanata Petit, . . ix, 95

- Subplebeia* Less. iii, 173; ix, 275
Subplicata Sowb. iv, 236; ix, 318
Subplicatula Bgt. ii, 157.
Subprofuga Stab. iii, 233; [ix, 256
Subpuella Pils. vii, 121; ix, 220
Subpulchella Sandb. . ix, 282
Subpyramidalis C. B. Ad. ix, 58
Subrepta H. & J. . ix, 140
Subrimata Reinh. ii, 140, 142.
Subroseotincta Woll. iv, 195; [ix, 294
Subrostrata Fér. iii, 231; ix, 249
Subrudis Pfr. . ix, 50
Subrufescens Mill. . ix, 273
Subrugata Pfr. ii, 169.
Subrugosa Braz. . ix, 35, 338
Subrugosa Dh. viii, 211; ix, 206
Subrugosa Grt. ii, 49.
Subrupicola Dall, ii, 160.
Subrutula Migh. ii, 124.
Subscabriuscula Bgt. . ix, 330
Subscalaris Bgt. . ix, 259
Subsecta Tate, iv, 66; . ix, 114
Subsenilis Cr. . ix, 325
Subsepulchralis Cr. vi, 22; [ix, 156
Subsidualis Cr. i, 117.
Subsimilis Dh. . ix, 207
Subsloaneana Pils. v, 110; [ix, 90
Subsquamulata Hde. . ix, 170
Substriata Cl. iv, 9; . ix, 256
Substrigata Bgt. . ix, 331
Subsulcata Mildff. . ix, 343
Subtecta Pfr. ii, 130.
Subterranea Bgt. ii, 138.
Subtersa Gass. iii, 35; . ix, 33
Subtigrina Bgt. . ix, 302
Subtilis Ant. ii, 113.
Subtilis Grt. iii, 66; . ix, 27
Subtilis Lwe. . ix, 288
Subtilissima Gld. ii, 117.
Subtricolor Mab. viii, 134; [ix, 4
Subtrochiformis Mouss. iii, [79; ix, 6
Subturrutula Nev. iii, 74.
Subtussulcata Wright, v, 51; [ix, 180
Subulivaga Mab. iii, 251.
Subunicolor Bttg. . ix, 304
Subunicolor C. & F. . ix, 191
Suburbana Paul. viii, 236; [ix, 331
Subvariegata Malz. viii, 163; [ix, 256
Subvitrea Pfr. vii, 107; ix, 220
Subzonata Bgt. . ix, 336
Subzonata Mouss. iv, 93; ix, 303
Succinacia Bttg. ii, 193.
Succincta H. Ad. vi, 118; [ix, 214
Succincta Rve. viii, 17; ix, 228
SUCCINEA Dr. . ix, xviii
Succinea Pfr. ii, 118.
Succinea Stud. ii, 171.
Succineus Rv. i, 183.
Succinulata Le Guill, ii, 124.
Sudensis Pfr. iii, 30; . ix, 48
Sudestensis Hedlev. . ix, 120
Suffodiens Bttg. viii, 219; ix, 205
Suffulta Bens. ii, 27.
Sulcifera Barel. ii, 21.
Sulcipes Mörch. iii, 84; ix, 4
SULCOBASIS Tap.-Can. . ix, 120
Sulcocinctus Mart. vi, 196; [ix, 155
Sulcosa Pfr. vi, 260; . ix, 120
Sulculata C. & J. . ix, 263
Sulfurata Mart. ii, 75.
Sulliotii Poll. . ix, 263
Sulphurea Rve. ii, 72.
Sulphurosa Morel. v, 54; ix, 189
Sultana Morel. iv, 202; ix, 330
Sumatrana Mart. ii, 79.
Sumatrana Mts. iv, 56; ix, 209
Sumatrensis Mouss. ii, 18.
Sumatrensis Schep. i, 178.
Sumichrasti C. & F. iii, 184; [ix, 199
Sundana Mart. ii, 79.
Superbus Cox, i, 172.
Superbus Pfr. vi, 81; . ix, 154
Superflua Rossm. ii, 191.
Superlita Morel. ii, 104.

- Supertexta Pfr. iv, 82 ; ix, 181
 Suppressa Say, ii, 200.
 Suprabadia Semp. viii, 246 ;
 [ix, 224
 Supracostata Kob. viii, 149 ;
 [ix, 288
 Supracostulata Schep. viii,
 [283 ; ix, 136
 Suprazona Mouss. . ix, 249
 Surinamensis Pfr. ii, 165.
 Surrecta Bttg. . ix, 112
 Surrentina Schm. iv, 218 ;
 [ix, 331
 Surrodonta Bgt. iv, 142 ; ix, 325
 Suspecta West. . ix, 251
 SUTERIA Pilsbry, . ix, 17
Sutilosa Fér. . ix, 131
 Suturalis Bttg. ii, 195.
 Suturalis Mlldff. . ix, 337
 Suturalis Mts. i, 178.
 Suturalis Pfr. iii, 49 ; . ix, 199
Swainsoniana C. B. Ad. v,
 [109 ; ix, 90
 Swainsoni Pfr. iii, 91 ; . ix, 6
 Swettenhami Morg. iii, 267.
Swifti Pfr. . ix, 58
 Swinhoei Pfr. vi, 115 ; . ix, 214
 Sydneyensis Cox, ii, 155.
 Sykesi Smith, . ix, 343
 Sylhetensis G.-A. i, 183.
Sylhetensis Aust. ii, 100.
 Sylvana Dohrn & Semp. ii, 49.
 Sylvanoides Semp. . ix, 231
 Sylvatica Dr. iv, 125 ; . ix, 322
Sylvestris Alt. . ix, 267
Sylvestris Hartm. . ix, 272
Sylvia Hutt. viii, 98 ; . ix, 32
Sylvicola Blanf. ii, 131.
 Symmetrica Crav. iii, 108.
 Synerosa Serv. . ix, 252
Synœcia Mlldff. viii, 133 ; ix, 5
 Syntela Bgt. . ix, 257
 Syrensis Pfr. iv, 28 ; . ix, 260
 Syriaca Ehr. iii, 197 ; . ix, 267
 Syriaca Kob. ii, 149.
 Syrosina Bgt. . ix, 260
 Systropha Alb. iii, 127 ; ix, 83
 SYSTROPHIA Pfr. . ix, 83
 Szechenyii Anc. . ix, 275
 Tabarkana L. & B. . ix, 250
 Tabellata Lwe. iv, 46 ; . ix, 243
Tabescens Cox, . ix, 13
 Tabida Pfr. iii, 94 ; . ix, 208
 Tabuensis Anc. iii, 218 ; ix, 169
 Tabulæ Chap. viii, 139 ; ix, 38
 Tacapica L. & B. . ix, 250
 TACHEA Leach, . ix, 320
 TACHEOCAMPYLÆA Pfr. ix, 304
Tachigyna West. . ix, 305
 Taconera Serv. . ix, 256
Tæniata Nyst. . ix, 199
Tæniata Rv. . ix, 243
Tæniata West. . ix, 250
Tæniata West. . ix, 275
Tæniata W. & B. iv, 37 ; ix, 243
 Tafermica L. & B. . ix, 251
 Tagalensis Dohrn, ii, 85.
 Tagina Serv. iv, 130 ; . ix, 324
 Tahaensis Try. ii, 115.
Takeitana Hartm. ii, 30.
 Tahitensis Grt. ii, 49.
 Tais Hombr. & Jacq. ii, 48.
 Taivanica Mlldff. ii, 21.
Taivanica Mlldff. iv, 33 ; ix, 171
 Takredica Bgt. . ix, 326
 Talamonica Kob. viii, 231 ;
 [ix, 331
 Talcosa Gld. ii, 52.
 Talepora Bgt. . ix, 251
Taliensis Hde. . ix, 211
 Talifouensis Hde. . ix, 211
 Talmacensis Blz. . ix, 252
 Talysehana Mts. iii, 195 ; ix, 267
 Tamarensis Pett. . ix, 35, 338
Tamautipasensis Lea, . ix, 74
 Tamora Hutt. viii, 70 ; . ix, 16
 Tamsiana Dkr. v, 169 ; ix, 95
 Tandianensis Theob. iii, 94.
 Tanæ Grt. iii, 62 ; . ix, 25
 Tanirensis Aust. ii, 99.
 Tanora Serv. . ix, 273
 Tanqueryi C. & F. iv, 64 ;
 [ix, 124
Tanychlamys Bens. ii, 8.
Tapada Gray, . ix, 316

- Tapeina* Bens. iv, 53; . ix, 209
Tapirina Hutt. iii, 23; viii, [97; ix, 33
Tapparonei Smith, . ix, 142
Taprobanensis Dohrn, ii, 84.
Taranaki Gray, . ix, 114
Tarapotonensis Moric. v, [170; ix, 95
Tarasconensis Bgt. . ix, 256
Tardyi Bgt. . ix, 252
Tarentina Kob. iv, 207; ix, 331
Tarentina Pfr. iv, 24; . ix, 263
Targioniana Paul. ii, 144.
Taria Bgt. . ix, 251
Tarifensis Bgt. . ix, 257
Tarnieri Morel. iii, 118; ix, 288
Taslei Cr. iii, 36; . ix, 33
Tasmaniae Cox, iii, 34; [ix, 35, 338
Tassyana Fag. . ix, 257
Tassyi Bgt. . ix, 271
Tatrica Haz. . ix, 288
Tauchoniana Bgt. . ix, 253
Tau Pfr. viii, 98; . ix, 33
Taumantias Tap.-Can. vii, [39; ix, 142
Taurica Cless. ii, 147.
Taurica Kryn. iv, 241; ix, 319
Taurica Partch. . ix, 259
Taurinensis Pini. . ix, 266
Taviuniensis Garr. viii, 133; [ix, 6
Taviuniensis Liard, ii, 125.
Tavinniensis (err. for taviun- [iensis) iii, 92; ix, 6
Tayloriana Ad. & Rv. vii, [58; ix, 142
Tchefouensis C. & D. iii, [182; ix, 275
Tchihatcheffi Kob. iv, 126; [ix, 322
Tchiliensis Mlldff. . ix, 206
Tebu Leach, . ix, 264
Tebourbana Let. & Bgt. ix, 250
Tecta Zgl. iii, 187; . ix, 272
Tectiformis Sowb. iv, 42; ix, 243
Tectula Lowe, . ix, 242
Tectuinsinense Mts. iv, 59; [ix, 207
Tehuantepecensis Cr. & [Fisch. ii, 165.
TELEOPHALLOGONA, ix, xxxiii.
Telitecta Mlldff. viii, 222; [ix, 122
Tellica Bgt. . ix, 260
Telonensis Mitt. iii, 186; ix, 275
Temperata Mss. iv, 164; ix, 327
Tenebraria Bgt. ii, 143.
Teneitensis Bgt. error for ten- [ietensis.
Tenella Garr. ii, 77.
Tenella Pfr. vi, 269; . ix, 124
Tenellus Gld. i, 171.
Tenera A. Ad. ii, 178.
Tenera Jonas, ii, 127.
Tenera Reinh. viii, 255; ix, 283
Tenera Sowb. vii, 179; . ix, 225
Tenera Stud. ii, 146.
Tenerrima C. B. Ad., v, 8; [ix, 67
Tenietensis Bgt. iii, 180; ix, 275
Tenimberica Mlldff. viii, [220; ix, 205
Tenimberica Mlldff. viii, 244; [ix, 220
Tennesseensis Lea, . ix, 77
Tentoriolum Gld. iii, 79; ix, 6
Tenuicostata Dkr. . ix, 184
Tenuicostata Grt. iii, 39; ix, 35
Tenuicostata Shutt. . ix, 341
Tenuicula H. Ad. ii, 97.
Tenuilabris Br. viii, 258; ix, 284
Tenuiradiata Q. & G. . ix, 142
Tenuisculpta West. . ix, 253
Tenuis Dillw. ii, 171.
Tenuis Mlldff. vii, 126; ix, 220
Tenuis Pfr. vii, 91; . ix, 125
Tenuistria Phil. . ix, 340
Tenuistriata Phil. . ix, 340
Tenuitesta Mlldff. viii, 273; [ix, 122
Tephrites Morel. v, 31; ix, 184
Tephrodes Pfr. vii, 183; ix, 224

- Terceirana* Morel. iv, 197 ;
 [ix, 293
Teriaensis G.-Aust. ii, 64.
Ternaria Hde. . . ix, 169
Ternatana Guill. iii, 76 ; ix, 5
Terrestris Forsk. . . ix, 318
Terrestris Gmel. . . ix, 204
Terrestris Penn. iv, 29 ; ix, 262
Terricola Bgt. . . ix, 257
Tersa Iss. ii, 117.
Tersa Zgl. . . ix, 288
Tertiana Blf. ii, 56.
Terveriana Grt. vi, 37 ; ix, 157
Terveriana Mouss. . ix, 264
Terveri Mich. iii, 240 ; ix, 249
Tescorum Bens. vi, 187 ; ix, 136
Tessellata Fér. . . ix, 291
Tessellata Mühlf. iii, 47 ; ix, 41
Tesseraria Bttg. . ix, 29
Testacea Mart. viii, 191 ; ix, 277
Testæ Phil. ii, 147.
Testudinalis Lwe. iv, 46 ; ix, 243
Testudinaria Gass. i, 119.
Testudo Pfr. vii, 89 ; ix, 157
Tetragona Mor. iv, 21 ; ix, 261
Tetrazona Jan. iv, 218 ; ix, 331
Tetrica Paiva, iv, 44 ; ix, 243
Tetrodon Möll. iii, 149 ; ix, 279
Tetrodontina Anc. . ix, 279
Tetuanensis Kob. ii, 196.
Tetuanensis Kob. iv, 213 ; ix, 330
Texasiana Moric. iii, 135 ;
 [ix, 74
Texta Hedley, viii, 294 ; ix, 35
Texta Mouss. iv, 248 ; ix, 320
Textilis Sh. iii, 31 ; ix, 48
Textrina Bens. ii, 83.
Textrix Pfr. iii, 35.
Teysmanni Mouss. ii, 76.
Thaisa Hutt. viii, 70 ; ix, 16
THALASSIA Alb. . . ix, 12
Thalassia Hutton, . ix, 12
Thalassina Porro, . ix, 324
THALASSOHELIX Pilsbry,
 [ix, 12
Thalia Dohrn, ii, 35.
Thamnivaga Mab. . ix, 307
Thanasima Mab. iv, 173 ; ix, 327
THIAPSIA Alb. ii, 9.
Thatcheri Cox, vi, 164 ; ix, 134
Thaumalea Mab. iv, 152 ;
 [ix, 327
THAUMATODON Pilsbry, ix, 26
Thayaca Bgt. iii, 11 ; ix, 234
Thea Alb. . . ix, 208
THEBA Risso, . ix, 264
Thelica Mab. vi, 47 ; ix, 158
THELIDOMUS Swains. . ix, 96
Thelidonta Swains, . ix, 96
Themera Mab. ii, 160.
Themera Mab. iv, 155 ; ix, 327
Themis Garr. viii, 134 ; ix, 6
Themita Mabilie, . ix, 307
Theobaldi West. . ix, 267
Theodori Anc. . ix, 259
Theodori Phil. ii, 83.
Theodosia Cl. . ix, 249
Thera Hutt. . ix, 30
Thera Let. & Bgt. . ix, 250
THERASIA Hutton, . ix, 15
Therasina Let. iii, 250.
Therella (Berth) B. . ix, 250
Theresæ Ben. iv, 224 ; ix, 331
Thersites Brod. vii, 104 ; ix, 216
THERSITES Pfr. . ix, 125
Thespesia Mab. iv, 183 ; ix, 328
Thessalica Bttg. iv, 238 ; ix, 319
Thessalonica Mouss. . ix, 303
Theta Pfr. . ix, 32
Thetis Pfr. vi, 290 ; ix, 112
Thibetica Dh. viii, 208 ; ix, 206
Thieroti Morg. viii, 133 ; ix, 4
Thiesseæ Mouss. iii, 24 ; ix, 249
Thiesseana Kob. iv, 244 ; ix, 319
Thinophila Bgt. iii, 229.
Thlipsa West. . ix, 337
Tholus W. G. B. iii, 135 ; ix, 74
Thomasia Moq.-Tand. . ix, 307
Thomasi Pfr. i, 65.
Thomensis Dohrn, ii, 127.
Thomensis Greef, ii, 221.
Thomsoniana Anc. . ix, 76
Thomsoni Cox, . ix, 34
Thomsoni Pfr. vii, 185 ; ix, 224
Thomsoni Smith, vii, 62 ; ix, 142
Thoracica Hde. iii, 221 ; ix, 210

- Thorpeiana* Braz. . . ix, 5
Thoryna Mab. iv, 185; ix, 328
Thuillieri Mab. . . ix, 256
Thusuroi Bgt. . . ix, 336
Thwaitesi Pfr. ii, 118.
Thymorum Alt. iv, 10; ix, 254
Thyroides Say, iii, 152; ix, 77
Thyroidus Say, . . ix, 77
THYROPHORELLA Greef. ii, 221.
Thyreus Bens. ii, 15.
THYSANOPHORA Streb. &
 [Pffr. ix, 54
THYSANOTA Albers, . ix, 207
Tiani Bgt. iii, 227; . ix, 337
Tiara Bk. ii, 73.
Tiara Martyn. . . ix, 189
Tiara Migh. iii, 38; . ix, 27
Tiarella W. & B. iv, 35; ix, 245
Tiberana Mouss. . . ix, 268
Tiberiana Ben. iv, 206; ix, 331
Tiberii Parr. iv, 225.
Tibetica Mldff. . . ix, 206
Ticaonica Brod. vii, 203; . ix, 227
Tichostoma Pfr. iii, 100; ix, 58
Tickelli Theob. ii, 132, 220.
Tiesenhauseni Gredl. viii, [227; ix, 302
Tietzeana Rolle, . . ix, 112
Tigraensis G.-A. vii, 85; ix, 170
Tigriana Bgt. . . ix, 325
Tigri Gerv. iv, 141; . ix, 325
Tigrina Ch. & Jan. iv, 107; [ix, 302
Tigrinus Semp. i, 173.
Tigris Hedl. viii, 293; ix, 164
Tiloriensis Ang. v, 194; ix, 167
Timandra Hutt. viii, 84; ix, 27
Timida Hombr. & J. ii, 213.
Timorensis Mts. iii, 83; ix, 4
Tineana Ben. iii, 253; ix, 260
Tineiformis Let. & Bgt. ix, 260
Tingitana Pal. iv, 132; ix, 324
Tinostoma Blf. ii, 45.
Tiranoi (Bgt.) Serv. ix, 326
Tirmaniana Anc. viii, 269; [ix, 105
Tirutana G.-A. ii, 66.
Tisemsinica Bgt. . . ix, 263
Tissotiana Bgt. . . ix, 260
Titania Hutt. viii, 62; . ix, 9
Titanica Pfr. ii, 31.
Titanodolena Pch. iii, 11; [ix, 234
Tlemcenensis Bgt. iii, 121; [ix, 288
Todarum Blanf. ii, 94.
Tohenica Bgt. iii, 227; ix, 337
Tollini Alb. iii, 108.
Tolosana Bgt. . . ix, 256
Tomasinelliana T. C. vii, 44; [ix, 142, 344
Tomentosa Pfr. iii, 212; ix, 124
Tomsetti Tate, vi, 143; ix, 131
Tomsoni Braz. vi, 175; ix, 134
Tongana Quoy, ii, 218.
Tongana Schm. ii, 49.
Tonkinorum Mab. viii, 120; [ix, 4
Tornata Born, . . ix, 93
Torrefacta C. B. Ad. iii, 7; [ix, 64
Torrefacta Lowe, . . ix, 341
Torresiana H. & J. . ix, 114
Torticollis (LeGuill), T.-C. ix, 113
Tortilabia Less. vi, 294; ix, 113
Tortilis Morel. iii, 125; ix, 83
Tortistylis Mouss. . . ix, 125
Torulus Fér. vi, 189; . ix, 343
Toukriana Bgt. . . ix, 326
Tourannensis Soul. iii, 209; [ix, 205
Tournoueri Crosse, . . ix, 106
Townsendiana Aust. & Nev. [ii, 120.
Townsendiana Lea, iv, 72; [ix, 76
Toxotrema Raf. . . ix, 69
Tracheloides Mke. . ix, 244
TRACHIA Albers, . . ix, 114
Trachia (Bgt.) Serv. . ix, 361
TRACHIOPSIS Pilsbry. . ix, 114
TRACHYCYSTIS Pilsbry, ix, 37
TRACHYSTYLA Pilsbry, ix, 224
Tradita Rve. iii, 48.
Tragomma Held. ii, 10.

- Trailli Pfr. vi, 207; . ix, 104
 Trajectura Cox, iii, 264; ix, 14
 Tranquebarica Fab. ii, 81.
Tranquilla Cox, iii, 261; ix, 13
 Transarata Mouss. iii, 79; ix, 6
 Transcaucasica Bay. iv, 85;
 [ix, 304
 Transenna Pils. vii, 112; ix, 220
 Transfuga Fag. . ix, 257
Transiberus Monts. . ix, 328
 Transitsans Bttg. ii, 192.
 Transitsans Sut. viii, 59; . ix, 9
Transitoria Pfr. . ix, 93
 Translucens Gundl. iii, 96;
 [ix, 58
Translucens King, . ix, 205
 Translucida Mort. ii, 153.
 Translucida Q. & G. viii, 29;
 [ix, 229
 Transsylvanica Blz. . ix, 275
 Transsylvanica Cless. ii, 143.
Transsylvanica Haz. . ix, 288
 Transversalis Mss. iii, 210;
 [ix, 205
 Traskii Newc. iv, 71; . ix, 199
 TRAUMATOPHORA Ancey,
 [ix, 146
 Travancorica Bens. ii, 41.
 Traversensis Leach. . ix, 77
 Traversi Smith, ii, 214; . ix, 16
 Treasuryensis Try., ii, 111.
 Tremata Let. & Bgt. . ix, 256
Tremeni Melv. & Pons. error for
 trimeni, viii, 135.
 Trenquellionis Grat. iv, 82;
 [ix, 198
 Trepidula Serv. viii, 171; ix, 256
 Triadis Kim. iii, 116; . ix, 288
 Triaria (Friv.) iii, 116; ix, 288
 Trica Paul, . ix, 331
 Tricarinata Blf. ii, 55.
 Tricastinorum Flor. iv, 9; ix, 256
 TRICHEULOTA Pilsbry, ix, 212
Trichia Hartm. . ix, 273
 Trichocoma Cr. iii, 45; . ix, 36
 TRICHOCHLORITIS Pilsbry,
 [ix, 123
 TRICHODISCINA Martens,
 [ix, 197
Trichodiscus Streb. . ix, 194
 Trichroa v. Mart. vii, 12; ix, 140
 Trichroa Pils. vii, 182; . ix, 224
 Trichosteiroma M. & P. viii;
 [143; ix, 38
 Trichothroa Bgt. . ix, 302
 Trichotropis Pfr. iv, 53; ix, 209
 Tricolor Marts. iii, 83; . ix, 5
 Tricolor Pfr. vii, 111; . ix, 220
 Tridentata Say, iii, 143; ix, 76
 Tridentina Fér. v, 109; ix, 90
 Tridentula Mill. v, 155; ix, 94
Tridonia Beck, . ix, 74
Tridopsis Beck, . ix, 69
 Trifasciata Chemn. ii, 17.
Trifasciella Beck, . ix, 187
 Triflosa Pfr. iii, 75.
Trigonophora Lam. . ix, 287
Trigonostoma Fitz. . ix, 284
 Trigonostoma Pfr. v, 132; ix, 190
 Trigrammephora Orb. iv, 80;
 [ix, 198
Trihelix Anc. . ix, 289
Trilamellaris G.-A. . ix, 146
 Trimeni M. & P. viii, 135.
 Tringa Fag. . ix, 256
 Trinitaria Gundl. v, 67; ix, 97
 Trinodis Kim. iii, 116; . ix, 288
 Triodonta d'Orb. v, 152; ix, 94
 Triodontoides Bld. iii, 135;
 [ix, 74
 TRIODOPSIS Raf. . ix, 74
Triodopsis Auct. Europ. ix, 308
 Triphera Bgt. . ix, 256
 Triplicata Mart. v, 165; ix, 95
Tripolitana Wood, . ix, 330
 Triptycha Shuttl. iii, 7; ix, 64
 Triscalpta Mart. vi, 8; . ix, 146
 Trisculpta Mlldff. . ix, 223
 Trisinuata Mart. vi, 11; ix, 290
 TRISSEXODON Pils. . ix, 288
 Tristis Pfr. iv, 255; . ix, 318
 Tristrami Pfr. iii, 253; . ix, 260
 Tritonensis LeGuill, ii, 46.
 Tritonensis LeGuill, vii, 88;
 [ix, 141
 Tritonidis Jus. . ix, 256
 Triumphalis Rve. vii, 42; ix, 142
 Trizonalis Grat. v, 93; . ix, 180

- Trizonaloides Brown, v, 94 ;
 [ix, 180
Trizona Rve. . . ix, 300
Trizona Zgl. iv, 108 ; . ix, 301
Trizonella Pils. v, 94 ; . ix, 180
Trobriandensis Hedl. viii,
 [290 ; ix, 142
Trochacea Gredl. viii, 200 ;
 [ix, 170
Trochalia Bens. vii, 88 ; ix, 116
Trochiformis Fér. iii, 79 ; ix, 6
Trochiformis Mont. ii, 173.
Trochilionoides Orb. i, 65.
Trochilus Poir, . . ix, 262
Trochiscus Held. ii, 11.
Trochiscus Held. . . ix, 278
Trochiscus Pfr. ii, 181.
Trochlea Pfr. iv, 30 ; . ix, 262
Trochlearis Andrz. . ix, 252
TROCHOCOENULUS Kob. ii, 172.
Trochoidalis Roffian, . ix, 307
Trochoidea Brown, . ix, 262
Trochoidea Mlldff. vi, 230 ;
 [ix, 109
Trochoides Desh. . . ix, 140
Trochoides Poir. iv, 27 ; ix, 262
TROCHOMORPHA Albers, ix, 1
Trochomorpha Mlldff. viii,
 [202 ; ix, 170
Trochomorphoides Nev. . ix, 168
TROCHONANINA Mss. ii, 6, 47.
Trochospira Mlldff. . ix, 146
Trochospira Mlldff. . ix, 170
TROCHOZONITES Pfef. ii, 7, 51.
Trochula A. Ad. iv, 59.
TROCHULA Schlüt, . . ix, 261
Trochulina Morel. ii, 183.
Trochulus Dillw. ii, 173.
Trochulus Hartm. . ix, 262
Trochulus Mlldff. ii, 60.
Trochulus Mlldff. . . ix, 170
Trochus Mlldff. viii, 201 ; ix, 170
Trochus Müll. ii, 71.
Trochus Q. & G. . . ix, 140
Troglodytes Morel. ii, 128.
Troilus Gld. iii, 92 ; . ix, 6
Trojana Kob. . . ix, 320
Troostiana Lea, iii, 131 ; ix, 73
Trophodon Raf. . . ix, 69
Tropidocochlis Loc. . ix, 258
Tropidophora Ad. & Rv. ii, 48.
Tropidophora Mab. ii, 190.
Tropidophorus Anc. . ix, 171
TROPIDOMPHALUS Pils. ix, 309
Tropidoptera Ancey, . ix, 36
Tropidotropis Ancey, . ix, 36
Troscheli Pfr. v, 28, . ix, 184
Trotteriana Bens. iii, 103 ;
 [viii, 135
Trucanini Pett. iii, 87 ; . ix, 34
Truentina Masc. iv, 243 ; ix, 319
Trutatiana Fag. . . ix, 257
Tryoni Newc. iii, 229 ; . ix, 200
Trypanomphala Pfr. . ix, 200
Tschudiana Ph. iv, 77 ; . ix, 198
Tuba Alb. vi, 258 ; . ix, 120
Tuberculosa Conr. viii, 184 ;
 [ix, 261
Tuber Mouss. iii, 81 ; . ix, 6
Tuckeri Pfr. iv, 65 ; . ix, 114
Tucumanensis Dör. iv, 78 ;
 [ix, 198
Tudiculata Binn. iv, 74 ; ix, 199
Tuffetii Less. vii, 51 ; . ix, 140
Tuguriolum M. & P. viii, 145 ;
 [ix, 38
Tugurium Bens. ii, 109.
Tukanensis Pfr. vii, 132 ; ix, 222
Tularensis Hemph. . ix, 199
Tullia Gray, ii, 211 ; . ix, 15
Tumescens West, iii, 185 ;
 [ix, 275
Tumens Dh. ii, 28.
Tumens Desh. ii, 72.
Tumida Pfr. v, 8 ; . ix, 67
Tumida Mlldff. . . ix, 224
Tumidosa Monts. . . ix, 330
Tumidula Marts. ii, 51.
Tumuloides Garr. iii, 70 ; ix, 24
Tumulorum W. & B. iv, 19 ;
 [ix, 258
Tumulus Gld. iii, 91 ; . ix, 6
Tunetana Let. & Bgt. . ix, 234
Tunetana Pfr. iv, 21 ; . ix, 261
Tunicata C. B. Ad. . ix, 67
Turanica Mart. ii, 88.

- Turatii* Parr. . ix, 255
Turbida Küst. . ix, 264
Turbinata Beck, ii, 80.
Turbinata Caffici, . ix, 249
Turbinata Desh. . ix, 140
Turbinata Jan. iii, 234; . ix, 249
Turbinata Val. . ix, 141
Turbinata Mor. ii, 22.
Turbinella Hde. . ix, 211
Turbinella Morel. iii, 51; ix, 57
Turbiniformis Bens. ii, 52.
Turbiniformis Pfr. iii, 96;
 [ix, 58
Turbinoides Brod. vii, 196;
 [ix, 227
Turbo Pfr. vii, 197; . ix, 227
Turbo Pils. . ix, 211
Turcica Chemn. iv, 22; . ix, 261
Turgens Dh. vii, 196; . ix, 227
Turgidula Wood, iv, 117.
Turmalis Morel. viii, 144; ix, 39
Turneri Pfr. i, 119; . ix, 54
Turricula Beck, . ix, 261
Turricula H. & J. . ix, 24
Turricula Lwe. iv, 33; . ix, 242
Turriculata Cox, ii, 179.
Turriculata Woll. . ix, 242
Turriplana Mor. iii, 120; ix, 288
Turris H. Ad. vii, 32; . ix, 141
Turris Semp. viii, 23; . ix, 228
Turrita Mart. . ix, 141
Turrita Mlldff. ii, 60.
Turritella H. Ad. ii, 176.
Turritella Parr. iv, 27; . ix, 263
Turtoni Flem. iii, 19; . ix, 47
Turturina Guirao, . ix, 324
Turturum Gmel. iii, 175.
Tuta Paul. viii, 173; . ix, 256
Tutuillæ Cox, ii, 181.
Tuxtlensis Cr. & Fisch. ii, 188.
Twartkoi Serv. . ix, 253
Tylota Westerl. . ix, 331
Typinsana A. & R. . ix, 210
Uber Pfr. viii, 41; . ix, 230
Udvarica Serv. ii, 159.
Uitenhagensis Kr. iii, 104;
 [ix, 37
Ullepitschi West, iv, 90; ix, 301
Ulostoma Alb. . ix, 69
Ultima Mouss. iii, 14; . ix, 234
Umbicula Sh. iv, 21; . ix, 258
Umbilicaria LeGuill. ii, 79.
Umbilicaris Brum. iv, 90.
Umbilicata Anton, . ix, 165
Umbilicata Mont. . ix, 44
Umbilicus Mark, . ix, 47
Umbraculorum Braz. ii, 178.
Umbraculum Pfr. . ix, 9
Umbraticola Aust. ii, 99.
Umbrica Charp. iv, 218, 224;
 [ix, 331
Umbrina Pfr. ii, 118.
Umbrosa Partsch. iii, 176;
 [ix, 275
Umbrosella Jouss. . ix, 275
Una L. & B. . ix, 250
Uncigera Petit. v, 164; . ix, 95
Uncopila Hde. iii, 208; ix, 204
Undina Pfr. vii, 103; . ix, 215
Undosa Blf. ii, 36.
Undata Lwe. iv, 189; . ix, 293
Undulata Fér. v, 72; . ix, 99
Undulata Fér. . ix, 27
Undulata Kob. iv, 207; ix, 330
Undulata Mich. iv, 206; ix, 331
Undulata Q. & G. . ix, 105
Unwini Braz. viii, 106. ix, 33
Unger Zel. . ix, 249
Unguicula Fér. vi, 249; ix, 119
Unguiculastra v. Mart. vi,
 [248; ix, 119
Unguiculina v. Mart. vi, 244;
 [ix, 119
Unguiculus Mor. i, 181.
Unguifera Mouss. iii, 132;
 [ix, 74
Ungulina Linn. vi, 243; ix, 119
Uniarmata Paul, iv, 220;
 [ix, 332
Unica Hde. ii, 217.
Unica Pfr. vii, 189; . ix, 225
Unicolor Bttg. . ix, 304
Unicolor Cox, viii, 276; ix, 132
Unicolor Pfr. vi, 37; . ix, 157
Unicolor West, . ix, 301

- Unicolor ii, 19.
 Unidentata Chemn. vi, 86 ;
 [ix, 150
 Unidentata Drap. iii, 171 ;
 [ix, 278
Unidentata Fér. . . ix, 89
Unifasciata DaCosta, iv, 117.
Unifasciata Poir., . . ix, 254
Unilamellata Grt. iii, 60 ;
 [ix, 27
Unilamellata Sm. viii, 91 ; ix, 28
Uninodata Gred. viii, 150 ;
 [ix, 287
Uniplicata Hartm. . . ix, 150
Unisulcata Mouss. ii, 215.
Unitæniata Btbg. iv, 88 ; ix, 300
Unizona Andr. . . ix, 254
Unizonalis H. Ad. . . ix, 212
Unizonalis Lam. ii, 76.
Unizonata Bgt. ii, 51.
Upolensis Mouss. ii, 119.
Upsonii Calk. ii, 174.
Uranus Pfr. ii, 33.
Urbana Cout. . . ix, 275
Urbarana Pech. . . ix, 251
Urmiensis Naeg. viii, 237 ;
 [ix, 333
Urnula Pfr. i, 128.
Urquharti Sut. . . ix, 15
Ursina Pfr. vi, 253 ; . ix, 120
Ursula Fér. iii, 188.
Urvillei H. & J. . . ix, 135
Usambarica Crav. iii, 155 ;
 [ix, 173
Ussatensis Bgt. . . ix, 256
Usticensis Calc. iii, 254 ; ix, 260
Ustulata Jay, . . ix, 231
Ustulata Lwe. . . ix, 336
Usurpans Furtado, iv, 40 ;
 [ix, 341
Usurpata Mss. ii, 47.
Uter Theob. ii, 80.
Uticensis (Bgt.) Péch. . ix, 320
Uticensis Kob. . . ix, 324
Uttillensis Anc. ii, 220.
Uvida G.-Aust. ii, 56.
Uvulifera Shutt. iii, 137 ; ix, 73
Uzielliana Paul. iv, 220 ; ix, 332
Uzielli Issel, ii, 157.
Vacans Guppy, ii, 182.
Vafella L. & B. . . ix, 257
Vafra West. ii, 191
Vaganensis Hag. . . ix, 257
Vagienna Poll. . . ix, 273
Vagoina Gredl. iv, 257 ; ix, 205
Vahine H. & J. . . ix, 6
Valcourtiana Bgt. . . ix, 256
Valdemusana Bgt. . . ix, 325
Valenciennesii Guill. iii, 93 ;
 [ix, 6
Valenciennesii Pfr. . . ix, 220
Valenciennii Eyd. . . ix, 222
Valentini Kob. viii, 239 ; ix, 319
Valeria Hutt. viii, 69 ; . ix, 16
Valeryana L. & B. . . ix, 250
Valida C. B. Ad. v, 113 ; ix, 90
Validior Mouss. . . ix, 261
Vallata Hde. viii, 158 ; ix, 344
Vallicola Pfr. ii, 94.
Vallionis Ret. . . ix, 320
Vallisneri Stef. iii, 117 ; ix, 288
VALLONIA Risso, . . ix, 282
Valtoni Rve. vi, 83 ; . ix, 154
Valvæformis Nyst. i, 64.
Valverdensis Lwe. . . ix, 327
Vancouverensis Lea, ii, 205.
Vannostrandii Bld. iii, 145 ;
 [ix, 76
Vanualavæ Cox, ii, 181.
Vargasiana Pfr. . . ix, 239
Variabilis Dr. iii, 230 ; ix, 249
Varians Mke. v, 24 ; . ix, 184
Varians Risso, . . ix, 252
Varians Ziegl. . . ix, 319
Variata West. . . ix, 249
Varicosa Pfr. iii, 23 ; . ix, 27
Varicosula West. . . ix, 234
Variecostata Sut. viii, 100 ;
 [ix, 33
Variegata Chemn. v, 38.
Variegata Friv. iii, 235 ; ix, 249
Variegata Gmel. . . ix, 318
Variegata Humph. ii, 73.
Variegata Mouss. . . ix, 255
Variolosa Pfr. ii, 42.

- Varronis* Cantr. . . ix, 300
Vasconica Bgt. ii, 196.
Vatonniana Bgt. iv, 31; ix, 256
Vavauensis Baird, ii, 114.
Vaysseti Marie, i, 113.
Veitchii Newc. iii, 228; ix, 200
Velanicia Mab. . . ix, 331
Velascoi Hid. iv, 103; ix, 256
Velasqueziana Poey, v, 32; [ix, 185
Velata Brod. viii, 12; ix, 231
Velata H. & J. iii, 61; ix, 29
Velaviana Bgt. . . ix, 256
Velebitana Klec. . . ix, 302
Vellavorum Bgt. . . ix, 267
Vellicata Forbes, ii, 205.
Velutina Lam. iii, 100; ix, 58
Velutina Sowb. ii, 85.
Velutinata Bk. . . ix, 181
Velutinoides Anton. . . ix, 97
Vendeana Let. . . ix, 275
Vendeperanensis Bgt. . ix, 275
Vendryesiana Gloyne, iii, 139.
Vendryesi Ckll. viii, 263; [ix, 90
Veneriana Let. & Bgt. ix, 263
Venetorum Bgt. iii, 185; ix, 274
Venezuelensis Jouss. viii, [112; ix, 57
Venosa Pse. ii, 116.
Ventiensis (B.) Fag. . ix, 266
Ventricosa Chem. viii, 10; [ix, 228
Ventricosa Drap. iv, 32; ix, 264
Ventricosa Jan. . . ix, 278
Ventricosa Mlldff. . . ix, 227
VENTRIDENS Binn. ii, 12, 199.
Ventrosa Auct. . . ix, 264
Ventrosula Pfr. iii, 136; ix, 74
Venulata Pfr. ii, 211; ix, 15
Venusta Gmel. . . ix, 189
Venusta Mart. ii, 69.
Venusta Mart. . . ix, 320
Venusta Streb. ii, 188.
Venustus Theob. i, 180.
Veprium Bgt. . . ix, 272
Veracruzensis Pfr. ii, 187.
Veranyi Bgt. . . ix, 256
Verecunda Pse. iii, 63; ix, 27
Verecundus Rve. . ix, 230
Vermetiformis Lwe. . ix, 242
Vermiculata Müll. iv, 128; [ix, 324
Vermiculosa Morel. iv, 149; [ix, 318
Vermiculum Lowe, ii, 144.
Vermiplicata Woll. iv, 178; [ix, 328
Vermis Rve. iv, 60; ix, 210
Verneaui Mab. iv, 161; ix, 327
Vernicosa Kr. i, 129; viii, 135.
Vernoni Sm. viii, 91; ix, 28
Veronica Pfr. iii, 49.
Verreauxii Pfr. i, 169.
Verrilli Anc. . . ix, 200
Verrucosa Reinh. iii, 219; [ix, 169
Verrucosa Monts. viii, 233; [ix, 330
Verrucosus G.-A. i, 183.
Verrucula Pfr. ii, 59.
Versicolor Born. v, 54; ix, 189
Versicolor Mlldff. viii, 246; [ix, 225
Verticillata Parr. iv, 27; ix, 263
Verticillata Pse. ii, 113.
Verticillus Fér. ii, 134.
Verticillus Moq. ii, 10.
Vesconis Morel. vi, 31; ix, 157
Vesica Lea, v, 49; ix, 180
Vesica Pfr. ii, 37.
Vesicalis Lam. . . ix, 152
Vesicula Bens. ii, 87.
Vesperalis Bgt. ii, 173.
Vespertina Morel. iv, 41; ix, 275
Vestalis Parr. iii, 240; ix, 249
Vesta Pfr. ii, 103.
Vestii Jick. ii, 118.
Vestita Ramb. . . ix, 257
Vesulana Less. . . ix, 302
Vettonica Serv. . . ix, 251
Vetula Gass. iii, 36; ix, 33
Vetula West. . . ix, 234
Vetusta M. & D. iv, 198; [ix, 293
Vetusta Mouss. . . ix, 327

- Vexans* Dohrn, v, 158; ix, 94
Vexillaris Pfr. vii, 46; ix, 140
Vibraiana Serv. ix, 307
Vicaria Mouss. ix, 35
Vicaria West. ix, 322
Vicentina Oppenh. ix, 295
Vicianica Bgt. ix, 256
Vicinalis Mouss. iii, 39; ix, 35
Vicina Rm. iii, 188; ix, 272
Vicinella Hde. ix, 210
Victoriæ Cox, vi, 149.
Vidaliana Mor. & Dr. ii, 159.
Vidali Hid. vii, 208; ix, 228
VIDENA H. & A. Adams, ix, 1
Vidua Blanf. ii, 95.
Vidua West. ix, 263
Vieillard Crosse, i, 116.
Vieta Rm. ix, 330
Vigenia Parr. ix, 331
Vigens Cox, iii, 263; ix, 35
Vigiensis Weinl. v, 46; ix, 182
Villis Pfr. iii, 190.
Ville Bonelli, ii, 157.
Villæ Desh. iii, 198; ix, 272
Villæ Mort. ii, 156.
Ville Mühlf. ix, 278
Villandrei Gass. i, 119.
Villari Hid. vii, 201; ix, 227
Villaris Pfr. ii, 105.
Villedaryi Anc. viii, 157; ix, 146
Villersii Malz. iii, 173; ix, 275
Villica Paul. iv, 218; ix, 331
Villiersii Orb. ix, 328
Villipensa Bens. ii, 94.
Villosa Stud. iii, 177; ix, 275
Villosula Zgl. iii, 176; ix, 275
Villula Bgt. ix, 274
Vimontiana Crosse, ii, 180.
Vineæ Paul. ix, 254
Vincentina Cr. iii, 59; ix, 27
Vincta Val. ix, 199
Vindobonensis Fér. iv, 124; [ix, 322
Vinitincta Cox, i, 115; ix, 35
Vintiensis Bgt. iii, 198.
Vintoni Desh. ii, 133.
Violacea Rossm. ix, 325
Viola (Pons.) viii, 234; ix, 330
Vipera Pfr. v, 181; ix, 166
Viperina Malz. ix, 305
Virago Bgt. ix, 319
Virens Mart. ii, 28.
Virens Pfr. i, 172.
Virens Pfr. ix, 228
Virescens Pfr. iii, 96; ix, 58
Virgata DaC. ix, 249
Virgata Jay, viii, 48; ix, 231
Virginea Ad. v, 39; ix, 183
Virginea Anc. ix, 191
Virginea Blanc. ix, 332
Virginea Lea, viii, 36; ix, 229
Virginia Morel. ii, 106.
Virgo Brod. vii, 119; ix, 219
Virgulata Sowb. iii, 77; ix, 6
Virgultorum Bgt. ix, 252
Viridescens M. & P. viii, [78; ix, 39
Viridiflava Mldff. ix, 342
Viridis Desh. vi, 56; ix, 158
Viridostriata Lea, vii, 178; [ix, 225
Viridula Mke. ii, 153.
Viridula Wallenb. ii, 154.
Virilis Gredl. iv, 259; ix, 170
Virilis Mouss. iii, 119; ix, 288
Visanica Fag. ix, 251
Visayana Mldff. ix, 209
Visgeriana Dohrn, iv, 193; [ix, 294
Vitellina Pfr. ii, 78.
Vitellus Shuttlew. ii, 69, 219.
Vitiensis Mouss. ii, 120.
Vitiensis Pfr. ii, 110.
Vitracea Beck. ix, 141
Vitracea Fér. vii, 106; ix, 109
Vitrea Bielz. ii, 142.
Vitrea Bonnet, ii, 48.
Vitrea Brown, ii, 138.
Vitrea Fér. vii, 33; ix, 141
VITREA Fitz. ii, 10, 137.
Vitrea Mart. ix, 143
Vitreola Bgt. ii, 141.
Vitreola Hde. ix, 170
Vitrina C. B. Ad. iii, 97; ix, 58
Vitrineformis Cox, iii, 261.
Vitrina Wagn. i, 64.

- Vitrinella* Beck, ii, 113.
Vitrinina Liard. ii, 121.
VITRINOCONUS Semp. viii, 296.
Vitrinoides Desh. ii, 90.
Vitrinoides Tristr. ii, 187; [ix, 57
Vitrinosa Zgl. . . ix, 267
Vittalacciana Mab. . ix, 305
Vittata A. & R. ii, 19.
Vittata Jan. . . ix, 301
Vittata Müll. iv, 120; . ix, 116
Vittata Rm. iv, 245; . ix, 320
Vivida Hagenm. . . ix, 257
Vocontiana Bgt. . . ix, 275
Volubilis Rve. . . ix, 222
Volutella Gass. i, 113.
Volutella Pfr. ii, 160.
Volvoxis Pfr. . . ix, 73
Vortex Beck, . . ix, 284
Vortex Oken. . . ix, 286
Vortex Pfr. iii, 98; . ix, 57, 58
Vortex West. . . ix, 254
Vorticella H. Ad. iii, 35; ix, 39
Vorticialis Bens. iii, 107; ix, 39
Votiva Crosse, iii, 214; ix, 173
Voyana Newc. ii, 206.
Vukotinovici Hirc. iii, 246; [ix, 252
Vulcanica Lwe. iv, 190; ix, 293
Vulcani G.-Aust. ii, 62.
Vulgaris Parr. iv, 249; ix, 320
Vulgarissima Mouss. iii, 245; [ix, 252
Vulgata Lwe. . . ix, 240
Vulgivaga S. & B. viii, 193; [ix, 209
Vulpis Gredl. vi, 116; . ix, 104
Vultuosa Gld. iii, 144; ix, 76
Vulvivaga error for vulgivaga, [viii, 193; ix, 209

Waandersiana Zoll. ii, 81.
Wagneri Grat. . . ix, 231
Wagneri Pfr. i, 62.
Wagneri Rossm. iv, 136; ix, 324
Waighouensis H. Ad. vii, 43; [ix, 142
Wairarapa Sut. viii, 88; ix, 28

Wairoaensis Sut. . . ix, 15
Walkeri Gray, i, 126.
Walkeri Pons. viii, 149; ix, 288
Wallacei Pfr. ii, 75.
Walleri Braz. vii, 12; . ix, 140
Wallisiana Mouss. iii, 126; [ix, 83
Walteri Bttg. iv, 98; . ix, 300
Waltoni Auct. . . ix, 154
Wanganensis Cox, ii, 124.
Wardiana Lea, ii, 196.
Warnefordi Nev. ii, 125.
Warnieriana Bgt. . ix, 257
Warroensis H. & Muss. viii, [281; ix, 133
Wasatchensis Hemph. viii, [116; ix, 50
Waterhousei Cox, ii, 215.
Watersi Angas, vi, 26; . ix, 156
Watsoniana Woll. iv, 21; [ix, 258
Webbiana Lwe. iv, 200; ix, 294
Webbii Lwe. . . ix, 258
Weberi Kob. viii, 236; ix, 330
Weinkauffiana Crse. ii, 43.
Weldii Ten.-Woods, ii, 217; [ix, 338
Welebitana Stentz, . ix, 272
Wellingtonensis Cox, . ix, 34
Wernerii Rolle, viii, 236; [ix, 333
Wesselliana Malz. i, 131.
Wesselensis Cox, vi, 170; ix, 134
Westerlundi Bl. iv, 115; ix, 277
Westerlundi Caffci, ii, 196.
Wetherbyi Bld. iii, 152; ix, 77
Weyrichi Schr. iii, 209; ix, 205
Whartoni Cox, vi, 171; ix, 134
Wheatleyi Bld. ii, 162.
Wheatleyi Bld. iii, 151; ix, 77
Whiteleggei Braz. viii, 106; [ix, 33
Whitneyi Newc. ii, 161.
Wilcoxi Cox, ii, 178.
Wilhelmi Pfr. iii, 53; . ix, 341
Wilkinsoni Braz. viii, 105; [ix, 33
Williamsiana Nev. . ix, 322

- Wilsoni Semp. ii, 118.
 Winteriana Pfr. iv, 54; ix, 209
 Wisemani Braz. vii, 109;
 [ix, 220
 Wittmanni Zow. . . ix, 306
 Woapoensis Grt. viii, 95; ix, 27
 Wolfii Miller, ii, 175.
 Wollastoni Lwe. iv, 199; ix, 293
 Woodiana Lea, vii, 206; ix, 227
 Woodiana Lea, . . ix, 205
 Woodiana Pfr. ii, 97.
 Woodianus Pfr. . . ix, 228
 Woodfordi Sowb. viii, 243;
 [ix, 220
 Woodlarkiana Souv. vii, 62;
 [ix, 142
 Woodwardia Tarn. iv, 20;
 [ix, 258
 Wrayi Morg. vii, 86; . ix, 116
 Wrighti Gundl. v, 49; ix, 180
 Wynnei Blanf. ii, 108.
 Wynyardensis Pett. . ix, 14

 Xalonica Serv. . . ix, 256
 Xanthelœa (B.) Fag. . ix, 302
 Xanthobasis Pils. vii, 155;
 [ix, 223
 Xanthochila Pfr. vii, 15; ix, 140
 Xanthochroa Crosse, ii, 167.
 Xanthoderma Mlldff. vi, 206;
 [ix, 104
 Xanthodon Ant. iv, 139; ix, 325
 XANTHOMELON Mart. ix, 134
 Xanthophaës Pils. viii, 242;
 [ix, 184
 Xanthosoma Pils. vii, 28;
 [ix, 141
 Xanthostoma Herk. vi, 197;
 [ix, 155
 Xanthotæniata Pils. . ix, 226
 Xanthotricha Pfr. ii, 85.
 Xatarti Far. iv, 118; . ix, 307
 Xenilica Serv. . . ix, 256
 Xera Hagenm. . . ix, 251
 Xeroacuta Monts. . ix, 263
 Xeroalbina Monts. . ix, 253
 Xeroamanda Monts. . ix, 258
 Xeroambigua Monts. . ix, 248
 Xeroampulla Monts. . ix, 248
 Xerobulla Monts. . ix, 248
 XEROCAMPYLÆA Kob. ix, 253
 Xerocauta Monts. . ix, 248
 Xerocincta Monts. . ix, 251
 Xeroclausula Monts. . ix, 253
 Xeroclivia Monts. . ix, 262
 Xerocochlea Monts. . ix, 262
 Xerocodia Monts. . ix, 258
 XEROCRASSA Monts. . ix, 247
 Xerofalsa Monts. . ix, 258
 Xerofriga Monts. . ix, 251
 Xerofusca Monts. . ix, 248
 Xerogyra Monts. . ix, 251
 Xerolæta Monts. . ix, 248
 Xerolauta Monts. . ix, 248
 Xerolaxa Monts. . ix, 251
 Xerolena Monts. . ix, 253
 Xerolenta Monts. . ix, 251
 XEROLEUCA Kob. ix, 260
 Xerolincta Monts. . ix, 248
 Xerolissa Monts. . ix, 248
 Xerolutea Monts. . ix, 248
 Xeromagna Monts. . ix, 248
 Xeromicra Monts. . ix, 253
 Xeromoesta Monts. . ix, 258
 Xeromunda Monts. . ix, 248
 Xeroneza Monts. . ix, 262
 Xeropieta Monts. . ix, 248
 Xeroplana Monts. . ix, 258
 Xeroplexa Monts. . ix, 258
 Xeroptyca Monts. . ix, 261
 Xerosecta Monts. . ix, 258
 Xerotricha Monts. . ix, 253
 Xerotringa Monts. . ix, 253
 Xerotropis Monts. . ix, 258
 Xerovaga Monts. . ix, 253
 Xerovaria Monts. . ix, 248
 Xerovera Monts. . ix, 248
 XESTA Alb. ii, 7, 68.
 XESTINA Pffr. ii, 7, 81.
 Xiphias Pfr. iii, 89; . ix, 5
 Xolotrema Raf. . ix, 69
 Xystera Val. vi, 33; . ix, 157

 Yaeyamensis Pils. . ix, 214

- Yahonensis Gass. i, 120.
 Yantaiensis C. & D. iii, 149; [ix, 279
 Yatalaensis Cox, vi, 140; ix, 131
Yatesiana Binn. . ix, 81
 Yatesi Coop. iii, 115; . ix, 81
 Yatesi Pfr. v, 173; . ix, 95
 Ycaunica Mab. . ix, 256
 Yessoensis Reinh. ii, 171.
 Yleobia Bgt. . ix, 319
 Yocotulana Dor. iv, 81; ix, 198
Yoldii Mörch. . ix, 119
 Youngi Grt. iii, 40; . ix, 35
 Yucatanea Morel. iii, 146; [ix, 74
 Yulei Forbes, vi, 172; . ix, 134
Yulensis Braz. . ix, 142

 Zaccarensis Kob. viii, 168; [ix, 249
 Zaffarina Terv. iv, 137; ix, 325
Zaleta Binn. . ix, 77
Zamboangæ Mts. . ix, 219
 Zanguebarica Crav. iii, 105; [ix, 39
 Zapateri Hid. ii, 157; . ix, 48
 ZAPHYSEMA Pilsbry, . ix, 65
 Zaragozensis Serv. . ix, 257
 Zaritosa Berthier, iii, 185.
 Zebina Braz. vi, 151; . ix, 133
 Zebra Le Guill. viii, 76; ix, 18
 Zebra Pfr. vi, 275; . ix, 111
 Zebrina Grt. iii, 64; . ix, 27
 Zebrina Ph. iii, 48; . ix, 41
 Zebuensis Brod. vii, 161; ix, 223
 Zeiliana Mts. . ix, 267
 Zelandiæ Gray, ii, 214; ix, 13
 Zelebori Pfr. iv, 83; . ix, 253
 Zelina Cox, vii, 78; . ix, 143
 Zelleri Kob. iv, 138; . ix, 325
 Zelota Mab. iv, 154; . ix, 327
 Zemonicensis Stoss. . ix, 251
 Zenatia Kob. iv, 144; . ix, 325
Zenobia Gray, . ix, 264
 Zenobia Pfr. viii, 131; . ix, 5
 Zeno Braz. vii, 53; . ix, 142
 Zenonis Gredl. iv, 59; . ix, 207
 Zerguana Hagenm. . ix, 251

Zeta Pfr. v, 63; . ix, 97
Zeta Pfr. . ix, 32
 Zeugitana L. & B. viii, 182;
 Zeus Jonas, ii, 32. [ix, 260
 Zhorquinensis Ang. v, 132; [ix, 190
 Ziczac Gld. ii, 210; . ix, 13
 Ziegleri Schm. iv, 109; ix, 303
 Zikaveiensis Hde. ii, 120.
 ZINGIS Mart. ii, 7, 51; viii, 135
Zinguletta H. & A. Ad. ix, 302
Zitanensis Let. & Bgt. ix, 336
 Zitanica Let. & Bgt. . ix, 251
 Zitoumica L. & B. . ix, 263
Zoae Pfr. . ix, 141
 Zodiacus Fér. vi, 259; . ix, 120
 Zollingeriana ii, 20.
 Zollingeri Pfr. iii, 82; . ix, 5
Zollingeri Mouss. not Pfr. ix, 5
 Zonalis Fér. vi, 284; . ix, 112
Zonaria Don. . ix, 249
Zonaria Linn. vi, 277; ix, 111
Zonaria Penn. . ix, 336
 Zonata Bgt. . ix, 234
 Zonata Bgt. . ix, 318
 Zonata Stud. iv, 92; . ix, 303
Zonatus Hasselt. . ix, 5
 Zonella Pfr. iv, 110; . ix, 277
 Zonifera Semp. . ix, 229
 Zonifera Sowb. vii, 141; ix, 222
Zonites Hartm. . ix, 299
 ZONITES Montf. ii, 9, 134.
 Zonites Pfr. ii, 186.
Zonites piestius Bgt. . ix, 234
 ZONITIDÆ ii, 3; . IX, xxviii
 ZONITOIDES Lehm. ii, 10, 171.
 Zonitomæa Let. ii, 188.
 Zonitomæa Let. viii, 189; ix, 272
 Zonulata Fér. vii, 91; . ix, 125
Zonula Wood, . ix, 116
 Zonulella Mouss. . ix, 113
 ZONYALINA Mts. ii, 11, 187.
 ZOOGENITES Morse, . ix, 281
 Zorgia Mab. iv, 179; . ix, 328
 Zoroaster Theob. iii, 211; ix, 205
 Zosterophora Pfr. ii, 74.
 Zrmanjæ Brus. . ix, 301
Zurama Leach, . ix, 282

Dates of Publication of the Parts of Volumes I to IX.

VOLUME I.

- Part 1, pp. 1 to 64; Jan. 12, 1885.
Part 2, pp. 65 to 128; Apr. 20, 1885.
Part 3, pp. 129 to 192; July 3, 1885.
Part 4, pp. 193 to 364; Oct. 12, 1885.

VOLUME II.

- Part 5, pp. 1 to 64; Jan. 23, 1886.
Part 6, pp. 65 to 128; May 3, 1886.
Part 7, pp. 129 to 192; July 28, 1886.
Part 8, pp. 193 to 265; Oct. 24, 1886,

VOLUME III.

- Part 9, pp. 1 to 64; Feb. 19, 1887.
Part 10, pp. 65 to 128; June 8, 1887.
Part 11, pp. 129 to 176; Sept. 2, 1887.
Part 12, pp. 177 to 313; Dec. 10, 1887.

VOLUME IV.

- Part 13, pp. 1 to 64; Mar. 16, 1888.
Part 14, pp. 65 to 128; July 1, 1888.
Part 15, pp. 129 to 192; Oct. 1, 1888.
Part 16, pp. 193 to 296; Jan. 3, 1889.

VOLUME V.

- Part 17, pp. 1 to 64; Apr. 17, 1889.
Part 18, pp. 65 to 128; July 5, 1889.
Part 19, pp. 129 to 176; Sept. 30, 1889.
Part 20, pp. 177 to 216; Mar. 7, 1890.

VOLUME VI.

- Part 21, pp. 1 to 64; May 27, 1890.
Part 22, pp. 65 to 128; Aug. 12, 1890.

Part 23, pp. 129 to 192; Dec. 16, 1890.

Part 24, pp. 193 to 324; May, 1, 1891.

VOLUME VII.

Part 25, pp. 1 to 64; Aug. 3, 1891.

Part 26, pp. 65 to 128; Nov. 3, 1891.

Part 27, pp. 129 to 192; Jan. 30, 1892.

Part 28, pp. 193 to 225; Apr. 25, 1892.

VOLUME VIII.

Part 29, pp. 1 to 48; July 25, 1892.

Part 30, pp. 49 to 112; Nov. 25, 1892.

Part 31, pp. 113 to 160; Feb. 25, 1893.

Part 32, pp. 161 to 314; July 1, 1893.

VOLUME IX.

Part 33, pp. 1 to 48; Nov. 16, 1893.

Part 34, pp. 49 to 112; Mar. 19, 1894.

Part 35, pp. 113 to 160; July 27, 1894.

Part 36, pp. 161 to 336; Feb. 2, 1895.

Part 33a, pp. i to xlviii; Feb. 2, 1895.

Index to Helices, April, 1895.

Errata to Volumes III to IX.

I am indebted to the kindness of Messrs. John Ponsonby and G. K. Gude for a large part of the following. Some other corrections also have been indicated in the several volumes.

VOLUME III.

Page 13, For *H. octinilla* read *octinella*.

Page 35, For *aulocospira* read *aulucospira*. It is a *Rhytida*, and identical with *R. multisulcata* Gass.

Page 44, For *corticola* read *corticicola*.

Page 74, *H. brunii* Mörch., is unfigured. Pl. 14, f. 4, represents *H. conulus* Mart.

Page 92, For *H. tavinniensis* read *H. taviuniensis*.

Page 95, For *Pacilozonites* Sandberger, read *Pacilozonites* Boettger.

Page 119, Read after *H. lens*, pl. 24, f. 12-14.

Page 138, For *microformis* Dall, read *microforis* Dall.

Page 148, After *H. elevata* read Pl. 31, figs. 57-59.

Page 158, For *H. fimbriosa* read *fimbriosa*.

Page 208, For *H. lutosa* read *lutuosa*.

Page 219, After *H. hilgendorffi* read Pl. 51, figs. 58, 59.

Page 239, For *H. sitisiensis* read *sitifensis*.

Page 242, For *H. americana* read *armoricana*.

VOLUME IV.

Page 17, After *H. meda* read Pl. 3, fig. 30.

Page 17, For *H. florentinae* read *florentinae*.

Page 30, For *H. sequentina* read *sequentiana*.

Page 89, For *lefeboriana* read *lefeburiana*.

Page 88, For *paucici* read *pancici*.

Page 101, After *v. insubrica* read pl. 24, figs. 28, etc.

Page 110, For *H. schaufussi* read *schaufussi*.

Page 110, After *H. zonella*, dele Pl. 48, figs. 92, 93, and read *unfigured*.

Page 116, After *H. lecta*, dele Pl. 32, fig. 39, and read *unfigured*.

Page 127, For *hemprichii* read *hemprichii*.

Page 132, After *H. tingitana* dele Pl. 64, f. 1-3, and read *unfigured*.

Page 140, For *H. odopacha* read *odopachya*.

Page 142, For *H. dastagui* read *dastugui*.

Page 155, *H. riprochi* read *riprochi*.

Page 177, *H. quadryi* read *gaudryi*.

Page 186, After *H. digna* read Pl. 63, fig. 38.

VOLUME V.

Page 26, For *H. costantior* read *constantior*.

Page 38, Line 17 from top, for *H. fuscolabris* read *fuscocincta*.

Page 41, Top line, for *nemorloides* read *nemoraloides*.

Page 44, Line 12 from top, for *deep narrow color* read *deep maroon color*.

Page 65, Line 17 from top, for *periphery* read *peristome*.

Page 67, After *H. trinitaria* read Pl. 17, figs. 38-40, 42, 43.

VOLUME VI.

- Page 21, After *H. eurychila* read pl. 64, figs. 56, 57.
 Page 23, After *H. stragulum* read pl. 64, figs. 64, 56, 66.
 Page 25, Line 6 from top, read pl. 66, in place of 64.
 Page 64, Line 12 from bottom, read pl. 66, in place of 64.
 Page 64, Line 7 from bottom, read pl. 66, in place of 64.
 Page 65, Line 20 from top, read pl. 66, in place of 64.
 Page 72, After *H. partuliformis* read pl. 42, fig. 29.
 Page 83, For *Waltoni* read *Valtoni*.
 Page 120, For *bathymorphora* read *bathmophora*.
 Page 137, For *mabellei* read *mabillei*.
 Page 171, For *sardilabiata* read *sardalabiata*.
 Page 261, Under *H. beatricis* add locality, *Fly River, New Guinea*.

VOLUME VII.

- Page 11, After *H. dampieri*, dele *Louisiade Archipelag*
 Page 25, For *lacteolata* read *lacteolota*.
 Page 53, Under *H. rangii* Less. read *New Guinea* instead of *N. Zealand*.
 Page 55, Under *H. macgillivrayi*, the reference to Hedley should read Proc. Roy. Soc. Queensland, not N. S. Wales.
 Page 61, Under *H. gurgustii*, read locality Rossel Island (not Russell).
 Page 69, For *leinardiana* read *lienardiana*.
 Page 78, For *cyrena* read *cyrene*. Locality, Ugi, Solomon Is.
 Page 106, For *allisteri* read *allasteri*.
 Page 122, After *H. æruginosa* read Pl. 26, fig. 4.

VOLUME VIII.

- Page 96, After *P. coma* read Vol. ix, pl. 6, f. 57-59.
 Page 97, After *P. tapirina* read Vol. ix, pl. 6, f. 63-65.
 Page 129, After *T. rubens* read pl. 57, figs. 1-3.
 Page 132, After *T. planoconus* read pl. 57, figs. 4-6.
 Page 136, After *P. browningii* read Vol. ix, pl. 10, figs. 8, 9.
 Page 150, Top line, for *supraplicata* read *supracostata*.
 Page 155, After *H. kiowaensis* dele f. 15.
 Page 156, After v. *arkansaensis* add f. 15.
 Page 156, After *P. jovia* read Vol. ix, pl. 40, f. 1-4.

- Page 159, After *var. solaciaca* read Pl. 44, figs. 83, 81.
 Page 168, After *H. zaccarensis* read Pl. 38, figs. 5-7, 11-13.
 Page 169, After *H. breveti* read Pl. 38, figs. 21, 22.
 Page 176, After *H. beadlei* read Pl. 46, figs. 47-49.
 Page 177, After *H. erkellii* v. *discrepanus* read Pl. 46, figs. 50, 51.
 Page 199, After *H. scalatella* read Vol. ix, pl. 64, f. 10-12.
 Page 205, Line 13 from bottom, read J. de C., 1887, not 1877.
 Page 206, For *H. constantinæ* read *constantiae*.
 Page 221, After *H. goniostoma* read Vol. ix, pl. 29, figs. 6, 7.
 Page 236, After *H. wernerii* read Pl. 28, figs. 88-90.
 Page 238, For *H. mazzulopsis* read *H. subaperta*. Ancey's description appeared June 20 ; that in Man. Conch., July 1.
 Page 240, After *H. streatori* dele reference to Vol. ix.
 Page 260, For *V. minonection* read *mionecton*.
 Page 263, For localities of *H. coagulum* and *cernua* read *Great Namaqualand*.
 Page 263, After *C. sieversi* read Vol. ix, pl. 22, f. 7, 8.
 Page 273, After *C. tenuitesta* read pl. 58, figs. 16, 17.
 Page 281, After *H. blomfieldi* var. *warroensis*, read Hedley and Musson.
 Page 281, After var. *pallida*, read Hedley and Musson.
 Page 283, After *H. supracostulata* read Vol. ix, pl. 27, f. 11-13.
 Page 295, After *E. dalbertsi* Braz. read Vol. ix, pl. 6, f. 55, 56.
 Page 306, Line 6, read 9-11, *Trochomorpha strubelli*.
 Page 308, Insert under PLATE 37, figs. 43-46, *Charopa albanensis* Cox, after Hedley, Vol. II, p. 209.

VOLUME IX.

Page xviii. Fischer (Journ. de Conchyl., 1890, p. 351) gives the following note on the date of Ferussac's *Tableaux Systématiques des Animaux Mollusques*: "1819, according to Rang ; 1821, according to the majority of authors ; 1822, according to a note in my copy, and according to the prospectus of the publication."

- Page 6, After *T. abrochroa* Cr., read iii, 91.
 Page 6, For *navagatorum* read *navigatorum*.
 Page 6, Dele *T. prostrata* Pse.
 Page 27, For *E. raratongensis* read *rarotongensis*.
 Page 34, For *E. siliens* Cox read *siliens* Cox.
 Page 38, Add to list, *P. actinotricha* Melv. & Pons. viii, 143.

Page 39, Add to range of *Amphidoza*, Argentine Republic, Southern Brazil.

Page 52, Add to range of *Pupisoma*, Ceylon.

Page 57, After *T. cecoides* read Tate, in place of Guppy.

Page 58, For *montetaurica* read *montetaurina*.

Page 64, Add to list of Sagda, *S. maxima* Simpson.

Page 93, Add to range of *Isomeria*, Peru.

Page 98, Add under *P. apollo*, the synonym *H. imperatrix* Gundl.

Page 99, Add to range of *Parthena*, Porto Rico.

Page 104, *C. palumba* Souv. is a synonym of *C. saulix* Pfr.; *C. saulix* Reeve (not Pfr.) is a synonym or form of *monochroa* Sowb.

Page 111, Add after *, *Jaw not ribbed*; and after * *, *Jaw ribbed*.

Page 140, For *spendescens* read *splendescens*.

Page 141, Unite under *P. antiqua* all species of that group, and omit *Borneo* from localities.

Page 142, For *diomedes* Bras. read *diomedes* Braz.

Pages 145, 146, Add to list of species, *P. azona* Gredl. viii, 158; *P. vallata* Hde. viii, 158; *P. beddomei* Hanley.

Page 147, CORILLA should be dated *June*, 1855 (not 1858).

Page 167, Add under *S. feisthameli* the synonyms *pointhameli* Alb.-Mart., *serpens* Spix.

Page 170, After *G. pæcilotrochus* read Nachr. '94, p. 114.

Page 173, Line 10, for *Euhaplogona* read *Protogona*.

Page 199, For *dupetithoursi* read *dupetithouarsi*.

Page 204, For *oncopila* read *uncopila*.

Page 204, *E. leprosa* is a synonym of *leprosula*.

Page 205, *E. rubens* and *semenovi* are duplicated in *Eulota* and *Theba*. Where they really belong must be settled by the position of the penis-retractor and form of mucus glands, still unknown.

Pages 208, 209, For *vulvivaga* read *vulgivaga*.

Page 209, For *loufouana* read *lofouana*.

Page 211, *Accedens* Hde. is an error for *accrescens* Hde.

Page 213, Add to Group of *luhuana*, *E. blakeana* Newc.

Page 228, For *senckendorffiana* read *seckendorffiana*.

Page 249, For *modica* Mouss. read *modica* Morel.; see p. 256.

Page 250, 251, From list of *unfig. species* omit *euxina* Cl., *salentina* Bl., *inversa* W., *perroudiana* Loc., *lemoinei* Deb., *armoricana* Bgt.

Pages 256, 257, From list of *unfig. sp.* omit *mendranoi* Serv., *grannonensis* Bgt., *agreabilis* Zgl., *arcuata* Zgl., *bardoensis* Bgt., *codia*

Bgt., *diniensis* Ramb., *lunulata* Kryn., *ramburi* Mab., *danieli* Bgt., *madritensis* Ramb., *djabbarica* Bgt., *hierocontina* W., *monicola* Pal.

Page 260, For *setabulensis* read *setubalensis*.

Page 261, For *lybica* read *libyca*.

Page 272, For *musicola* read *muscicola* Bgt., not Phil. It is a synonym of *crenophila* Pfr.

Page 274, For *melaspinae* read *malaspinae*.

Page 305, For *H. cyrniaca* read *revelierei* Deb. See Journ. Conch., 1867, p. 311.

Page 319, For *leucorum* read *lucorum*.

Page 322, For *nemoralis* Müll. read *nemoralis* Linné.

Page 325, For v. *angustata* Rm. read v. *angustata* Rm.

Page 325, For *H. rereyana* read *rerayana*.

Page 327, For *H. benthencourtiana* read *bethencourtiana*.

Page 327, For *H. riprochi* read *riprochi*.

Synopsis of Families, Subfamilies, Genera and Subgenera of Helices.

NOTE.—The numbers refer to pages of Vol. IX, whereon the several groups are treated. Genera are in Roman, subgenera and sections in *Italic* type. The sequence of groups adopted is from those with simple to those with complex reproductive organs, and represents in a general way the phylogenetic history of the family, the *Protozona* being believed to be the primordial stock of *Helicidae*. The inter-relations of the groups are shown on p. xxi, of Vol. IX. The linear arrangement given below is necessarily unnatural, being interrupted by the interpolation of the *Teleophallogona* and *Macroogona*.

[*Trochomorpha* belongs to the family *Zonitidae*. The position of *Solaropsis*, *Plectopylis*, *Chalepotaxis* and some other groups is quite uncertain.]

Family ENDODONTIDÆ Pilsbry (Vol. ix, p. xxviii).

Group POLYPLACOGNATHA Pils.

1, *Punctum* Morse. 6.

2, *Laoma* Gray, 8.

Phrixgnathus Hutt., 9.

Group HAPLOGONA Pils.

- | | |
|---------------------------------|-----------------------------------|
| 3, Flammulina Mart., 10. | <i>Nesophila</i> Pils., 27. |
| <i>Phacussa</i> Hutt., 12. | <i>Ptychodon</i> Anc., 27. |
| <i>Thalassohelix</i> Pils., 12. | <i>Helenoconcha</i> Pils., 28. |
| <i>Gerontia</i> Hutt., 14. | <i>Brazieria</i> Anc., 29. |
| <i>Allodiscus</i> Pils., 14. | <i>Phenacharopa</i> Pils., 29. |
| <i>Pyrrha</i> Hutt., 15. | <i>Æschrodomus</i> Pils., 30. |
| <i>Therasia</i> Hutt., 15. | <i>Paratrochus</i> Pils., 31. |
| <i>Phenacohelix</i> Sut., 16. | ? <i>Coliolus</i> Tap.-Can., 171. |
| <i>Suteria</i> Pils., 17. | <i>Charopa</i> Alb., 31. |
| <i>Flammulina</i> Mart., 17. | <i>Acanthoptyx</i> Anc., 35. |
| <i>Hedleyoconcha</i> Pils., 18. | <i>Tropidotropis</i> Anc., 36. |
| <i>Monomphalus</i> Anc., 19. | <i>Pterodiscus</i> Pils., 36. |
| <i>Rhytidopsis</i> Anc., 20. | 7, <i>Pyramidula</i> Fitz., 42. |
| <i>Carthaea</i> Hutt., 339. | <i>Pyramidula</i> Fitz., 43. |
| 4, <i>Phasis</i> Alb., 36. | <i>Microconus</i> Streb., 340. |
| <i>Trachycystis</i> Pils., 37. | <i>Patulastra</i> Pfr., 44. |
| ? <i>Sculptaria</i> Pfr., 39. | <i>Planogyra</i> Morse, 45. |
| 5, <i>Amphidoxa</i> Alb., 39. | <i>Gonyodiscus</i> Fitz., 45. |
| <i>Stephanoda</i> Alb., 40. | <i>Lyrodiscus</i> Pils., 341. |
| 6, <i>Endodonta</i> Alb., 20. | <i>Lyrula</i> Woll., 341. |
| <i>Diglyptus</i> Pils., 22. | <i>Patula</i> Held., 48. |
| <i>Libera</i> Garr., 23. | <i>Atlantica</i> Anc., 50. |
| <i>Endodonta</i> Alb., 24. | <i>Helicodiscus</i> Morse, 51. |
| <i>Thaumatodon</i> Pils., 26. | |

Group

- 8, *Pararhytida* Anc., 52.
 Platyrrhytida Ckll., 342, 53.

Family HELICIDÆ Pilsbry (vol. ix, p. xxviii).

Group PROTOGONA Pils., xxxii (*Polygyrina*).

- | | |
|-----------------------------------|---------------------------------|
| 1, <i>Praticolella</i> Mart., 67. | <i>Ammonitella</i> Coop., 80. |
| 2, <i>Polygyra</i> Say, 68. | 4, <i>Polygyratia</i> Gray, 81. |
| <i>Polygyra</i> Say, 71. | <i>Systrophia</i> Pfr., 83. |
| <i>Triodopsis</i> Raf., 74. | ? <i>Coxia</i> Anc., 83. |
| <i>Stenotrema</i> Raf., 77. | ? <i>Solaropsis</i> Beck, 166. |
| 3, <i>Polygyrella</i> Binn., 78. | 5, <i>Dorcasia</i> Gray, 172. |

Group MACROGONA Pils., xxxii, (*Acavinæ*).

- | | |
|------------------------------------|-------------------------------------|
| 6, <i>Stylodonta</i> C. & J., 149. | 11, ? <i>Macrocyclis</i> Beck, 165. |
| 7, <i>Helicophanta</i> Fér., 151. | 12, <i>Pedinogyra</i> Alb., 158. |
| 8, <i>Acavus</i> Montf., 153. | 13, <i>Anoglypta</i> Mart., 159. |
| 9, <i>Pyrochilus</i> Pils., 154. | 14, <i>Caryodes</i> Alb., 161. |
| 10, <i>Ampelita</i> Beck., 155. | 15, <i>Panda</i> Alb., 163. |
| <i>Pæcilostylus</i> Pils., 158. | |

Genera incertæ sedis.

- | | |
|------------------------------------|--------------------------------------|
| 16, <i>Plectopylis</i> Bens., 143. | 17, <i>Corilla</i> H. & A. Ad., 147. |
| <i>Traumatophora</i> Anc., 146. | |
| <i>Stegodera</i> Mart., 147. | |

Group TELEOPHALLOGONA Pils., xxxii, 84 (*Sagdinæ*).

- | | |
|---------------------------------------|-------------------------------|
| 18, <i>Thysanophora</i> Str. & Pffr., | 20, <i>Sagda</i> Beck, 58. |
| [54. | <i>Hyalosagda</i> Mart., 61. |
| 19, <i>Zaphysema</i> Pils., 65. | <i>Odontosagda</i> Mart., 65. |

Group EPIPHALLOGONA Pils., xxxiii, 84 (*Camæninæ*).

- | | |
|--------------------------------------|-----------------------------------|
| 21, <i>Pleurodonte</i> F. de W., 84. | 24, <i>Planispira</i> Bk., 110. |
| <i>Pleurodonte</i> , 87. | <i>Planispira</i> Bk., 111. |
| <i>Caprinus</i> Montf., 90. | <i>Cristigibba</i> Can., 112. |
| <i>Gonostomopsis</i> Pils., 91. | <i>Angasella</i> Ad., 113. |
| <i>Caracolus</i> Montf., 92. | <i>Trachia</i> Alb., 114. |
| <i>Isomeria</i> Alb., 93. | 25, <i>Chloritis</i> Beck, 117. |
| <i>Labyrinthus</i> Bk., 94. | <i>Sulcobasis</i> Can., 120. |
| <i>Polydontes</i> . | <i>Austrochloritis</i> P., 121. |
| <i>Thelidomus</i> Sw., 96. | <i>Trichochloritis</i> P., 123. |
| <i>Zachrysia</i> Pils., 97. | 26, <i>Albersia</i> H. Ad., 124. |
| <i>Polydontes</i> Montf., 97. | 27, <i>Thersites</i> Pfr., 125. |
| <i>Parthena</i> Alb., 98. | <i>Thersites</i> . |
| <i>Luquillia</i> Cr., 99. | <i>Glyptorhagada</i> P., 129. |
| <i>Euryeratera</i> Bk., 100. | <i>Badistes</i> Gld., 129. |
| 22, <i>Camæna</i> Alb., 101. | <i>Hadra</i> Alb., 131. |
| <i>Phænicobius</i> Mch., 104. | <i>Sphærospira</i> Mch., 132. |
| <i>Pseudobba</i> Mlldff., 105. | <i>Xanthomelon</i> Mart., 134. |
| <i>Camænella</i> Pils., 105. | <i>Rhagada</i> Alb., 135. |
| <i>Neocepolis</i> Pils., 106. | 28, <i>Papuina</i> Mart., 136. |
| 23, <i>Obba</i> Beck, 107. | <i>Dendrotrochus</i> P., 143. |
| <i>Oreobba</i> Pils., 109. | 29, <i>Ganesella</i> Blanf., 168. |
| | ? <i>Coliolus</i> Can. 171. |

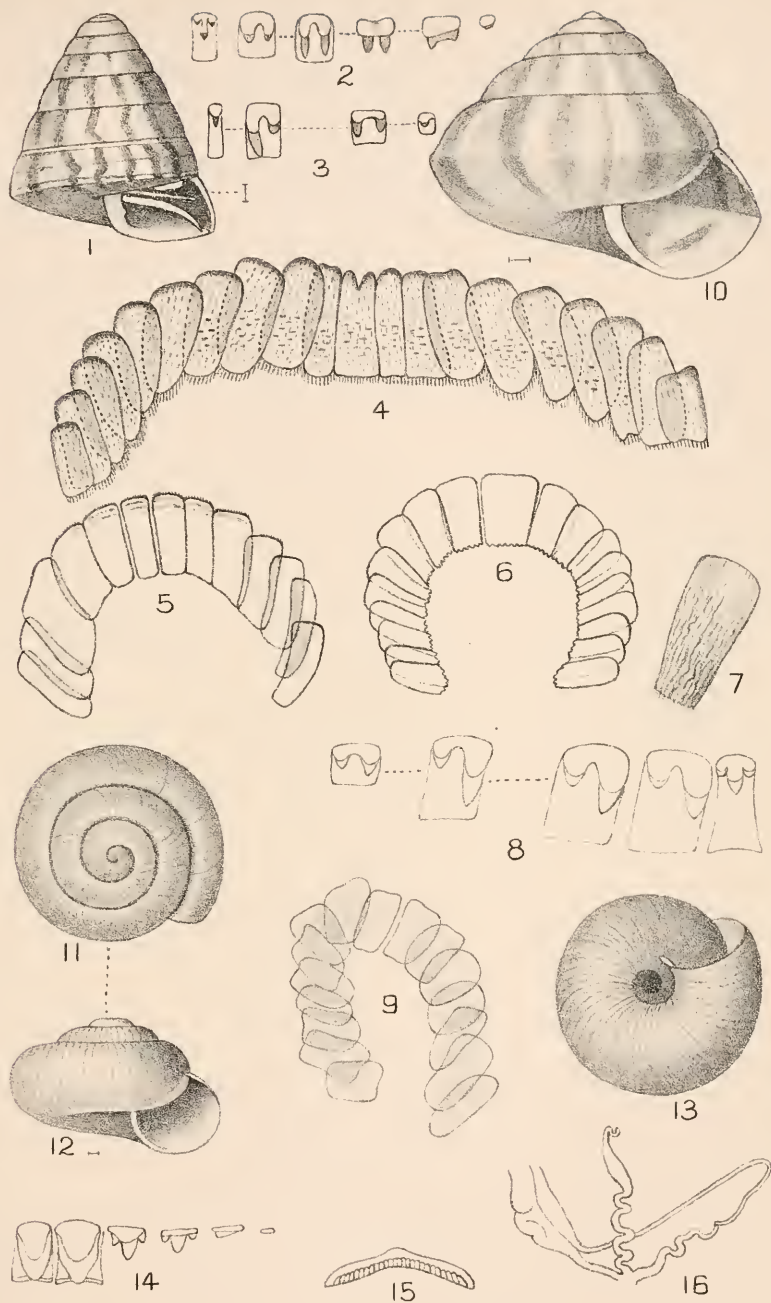
Group BELOGONA (v. Iher.) Pils. xxxiii, 173 (*Helicinæ*).

Belogona Euadenia Pils., 175.

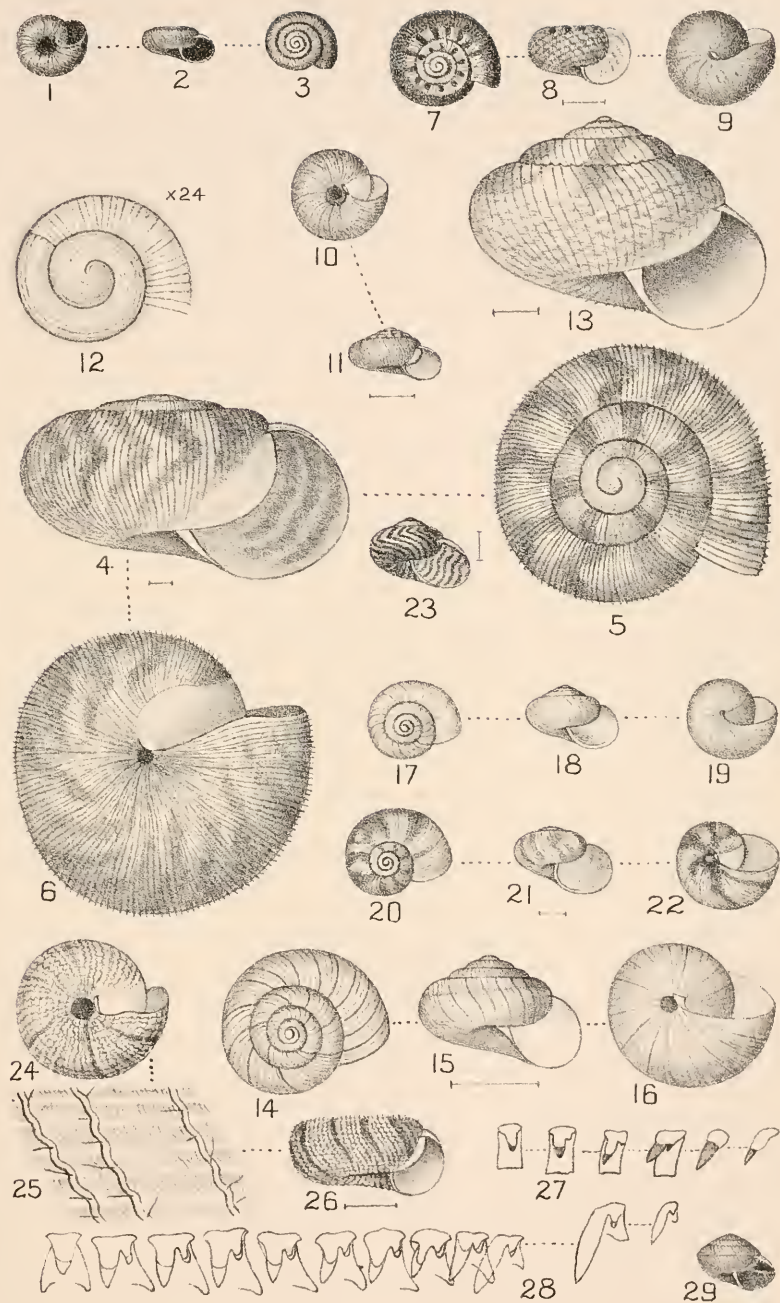
- | | |
|---------------------------------------|--------------------------------------|
| 30, <i>Cepolis</i> Montf., 177. | <i>Euhadra</i> Pils., 212. |
| <i>Cepolis</i> Montf., 179. | <i>Mandarina</i> Pils., 214. |
| <i>Jeanneretia</i> Pfr., 180. | 37, <i>Pupisoma</i> Stol., 52. |
| <i>Eurycampia</i> Mart., 180. | 38, <i>Aulacospira</i> Mlldff., 279. |
| <i>Coryda</i> Alb., 181. | <i>Pseudostreptaxis</i> Mlldff. |
| <i>Dialeuca</i> Alb., 182. | 39, <i>Chalepotaxis</i> Anc., 167. |
| <i>Hemitrochus</i> Sw., 183. | 40, <i>Chloræa</i> Alb., 214. |
| <i>Plagiptycha</i> Pfr., 185. | 41, <i>Helicostyla</i> Fér., 216. |
| <i>Cysticopsis</i> Mörch., 186. | <i>Corasia</i> Alb., 219. |
| 31, <i>Polymita</i> Beck, 187. | <i>Crystallopsi</i> Anc., 220. |
| 32, <i>Oxychona</i> Mörch, 189. | <i>Pfeifferia</i> Gray, 221. |
| 33, <i>Lysinoe</i> Ads., 191. | <i>Leytia</i> Pils., 221. |
| 34, <i>Glyptostoma</i> B. & B., 192. | <i>Chromatosphæra</i> Pils., 221. |
| 35, <i>Epiphragmophora</i> Dör., 193. | <i>Calocochlea</i> Hartm., 222. |
| <i>Pilsbrya</i> Anc. | <i>Anixa</i> Pils., 223. |
| <i>Angrandiella</i> Anc. | <i>Trachystyla</i> Pils., 224. |
| <i>Averellia</i> Anc. | <i>Helicostyla</i> Fér., 224. |
| <i>Trichodiscina</i> Mart. | <i>Cochlodryas</i> Mart., 225. |
| <i>Micrarionta</i> Anc. | <i>Orustia</i> Mörch., 225. |
| <i>Helminthoglypta</i> Anc. | <i>Pachysphæra</i> Pils., 226. |
| <i>Monadenia</i> Pils. | <i>Columpica</i> Hartm., 226. |
| 36, <i>Eulota</i> Hartm., 200. | <i>Helicobulinus</i> Brod., 226. |
| <i>Eulota</i> Hartm., 202. | <i>Orthostylus</i> Bk., 227. |
| <i>Armandia</i> Anc., 205. | <i>Hypselostyla</i> Mart., 228. |
| <i>Cathaica</i> Mlldff., 205. | <i>Papustyla</i> Pils., 229. |
| <i>Pseudiberus</i> Anc., 207. | <i>Eudoxus</i> Alb., 229. |
| <i>Platypetatus</i> Pils., 207. | <i>Phengus</i> Alb., 230. |
| <i>Thysanota</i> Alb., 207. | <i>Canistrum</i> Mörch., 230. |
| <i>Plectotropis</i> Mart., 208. | <i>Prochilus</i> Alb., 231. |
| <i>Aegista</i> Alb., 210. | <i>Chrysallis</i> Alb., 231. |
| <i>Coccoglypta</i> Pils., 211. | 42, <i>Leucochroa</i> Beck., 232. |
| <i>Mastigeulota</i> Pils., 211. | <i>Sphincterochila</i> Anc. |
| <i>Tricheulota</i> Pils., 212. | |

Belogona Siphonadenia Pils., 235.

- 43, *Geomitra* Sw., 238.
Plebecula Lwe., 239.
Lemniscia Lwe., 240.
Hispidella Lwe., 240.
Spirorbula Lwe., 240.
Actinella Lwe., 241.
Caseolus Lwe., 242.
Hystericella Lwe.
Discula Lwe.
Disculella Pils.
Heterostoma Hartm., 244.
Geomitra Sw., 244.
- 44, *Helicella* Fér., 245.
Xerocrassa Monts., 247.
Heliomanes Moq., 248.
Helicella Fér., 249.
Xerocampylæa Kob., 253.
Candidula Kob., 253.
Monilearia Mouss., 257.
Jacosta Gray, 258.
Xeroleuca Kob., 260.
Obeus Hartm., 261.
Trochula Schlüt., 261.
Cochlicella Fér., 263.
Theba Risso, 264.
Lejeania Anc., 267.
Platytheba Pils., 268.
- 45, *Hygromia* Risso, 269.
Hygromia, 271.
Monacha Fitz., 271.
Fruticicola Held, 272.
Ciliella Mouss., 275.
Metafruticicola Iher., 276.
Perforatella Schlüt., 277.
Dibothrion Pfr., 278.
Metodontia Mildff., 279.
- 46, *Acanthinula* Bk., 280.
Zoögenites Mse., 281.
- 47, *Vallonia* Risso, 282.
- 48, *Helicodonta* Fér., 284.
Drepanostoma Porro.
Helicodonta s. s.
Aspasita West.
Trissexodon Pils.
Caracollina Beck.
Klikia Pils., 289.
? *Mœllendorffia* Anc., 289.
- 49, *Allognathus* Pils., 290.
- 50, *Leptaxis* Lowe, 291.
Pseudocampylæa Pfr.
Leptaxis s. s.
Lampadia Lwe.
- 51, *Fridolinia* Pils., 294.
Pseudoleptaxis Pils.
- 52, *Dentellocaraculus* Opp., 294.
Prothelidomus Oppenh.
- 53, *Helicigona* Fér., 296.
Helicigona s. s., 298.
Chilostoma Fitz., 299.
Fruticocampylæa Kob., 303.
Tacheocampylæa Pfr., 304.
Arianta Leach, 305.
Elona Ads., 307.
Isognomostoma Fitz., 308.
Tropidomphalus Pils., 309.
Metacampylæa Pils., 310.
Galactochilus Sdb., 310.
Mesodontopsis Pils., 310.
- 54, *Cyrtochilus* Sdb., 311.
- 55, *Helix* Linné, 311.
Euparypha Hartm., 336.
Eremina Pfr., 334.
? *Parachloræa* Sdb., 333.
Levantina Kob., 333.
Iberus Montf., 328.
Hemicycla Sw., 326.
Otala Schum., 322.
Tachea Leach, 320.
Helicogena Fér., 316.





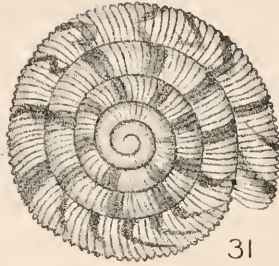




30



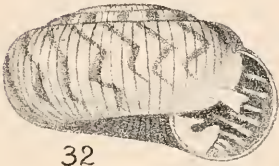
33



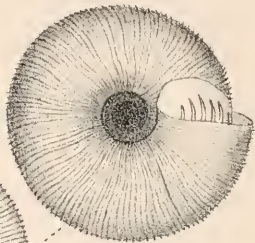
31



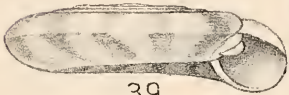
34



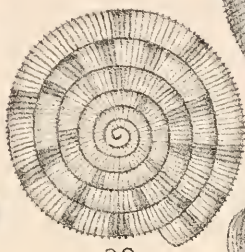
32



35



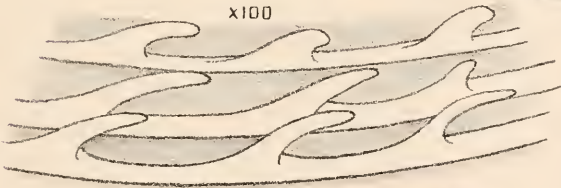
39



36



37



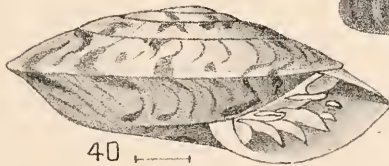
38



43



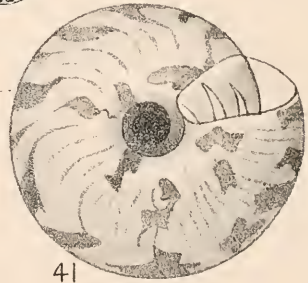
42



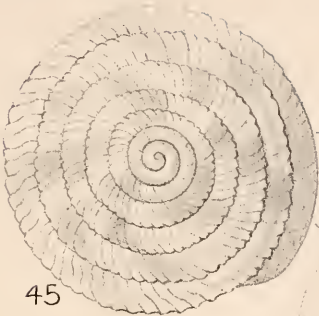
40



44



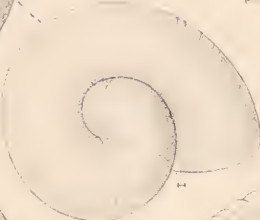
41



45



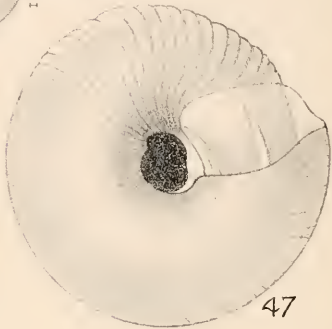
46



48



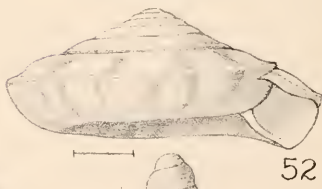
49



47



50



52



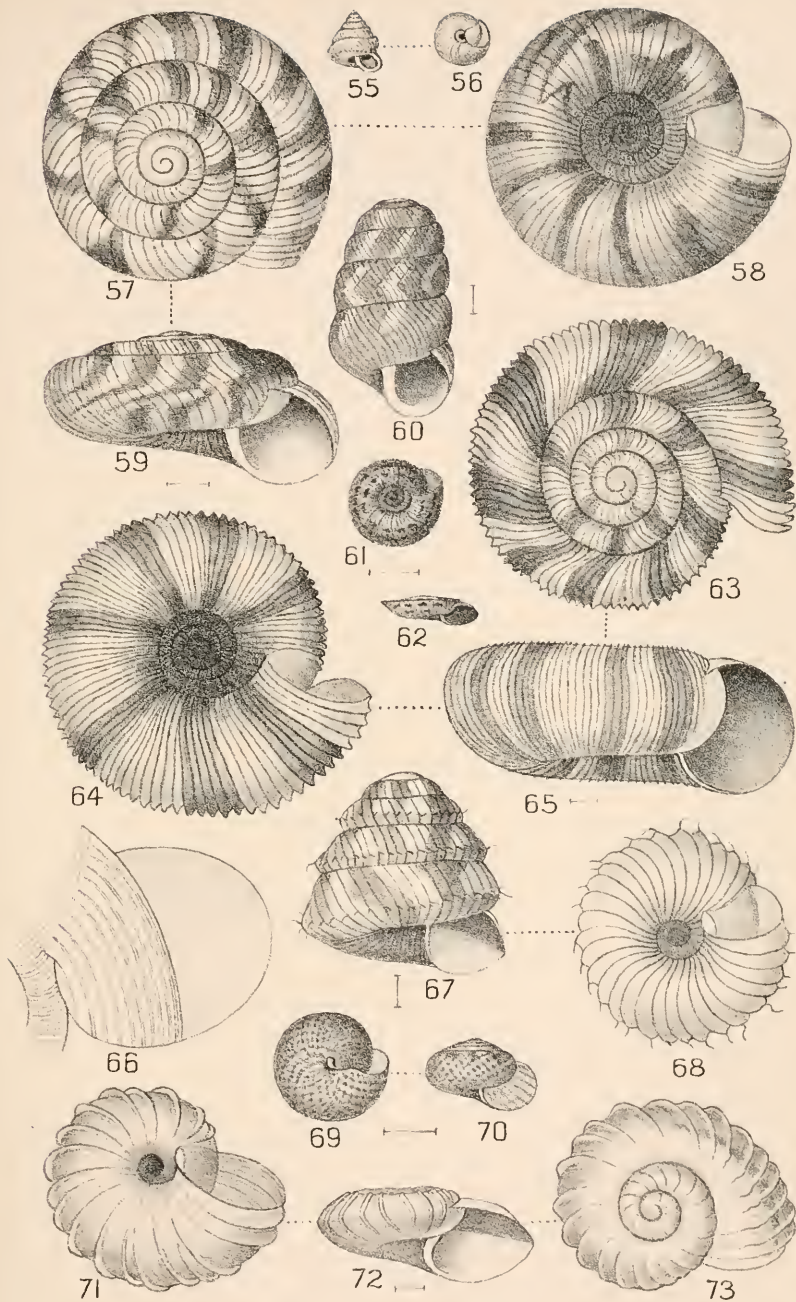
51

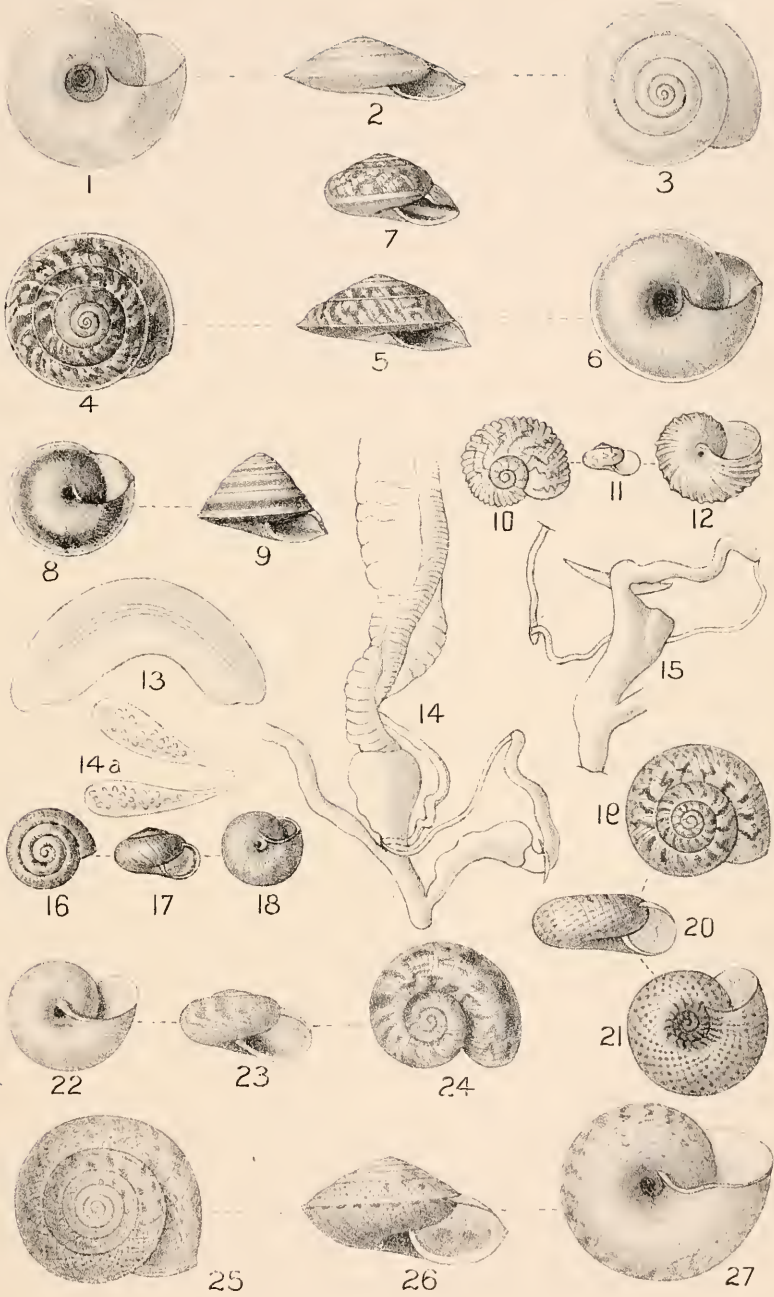


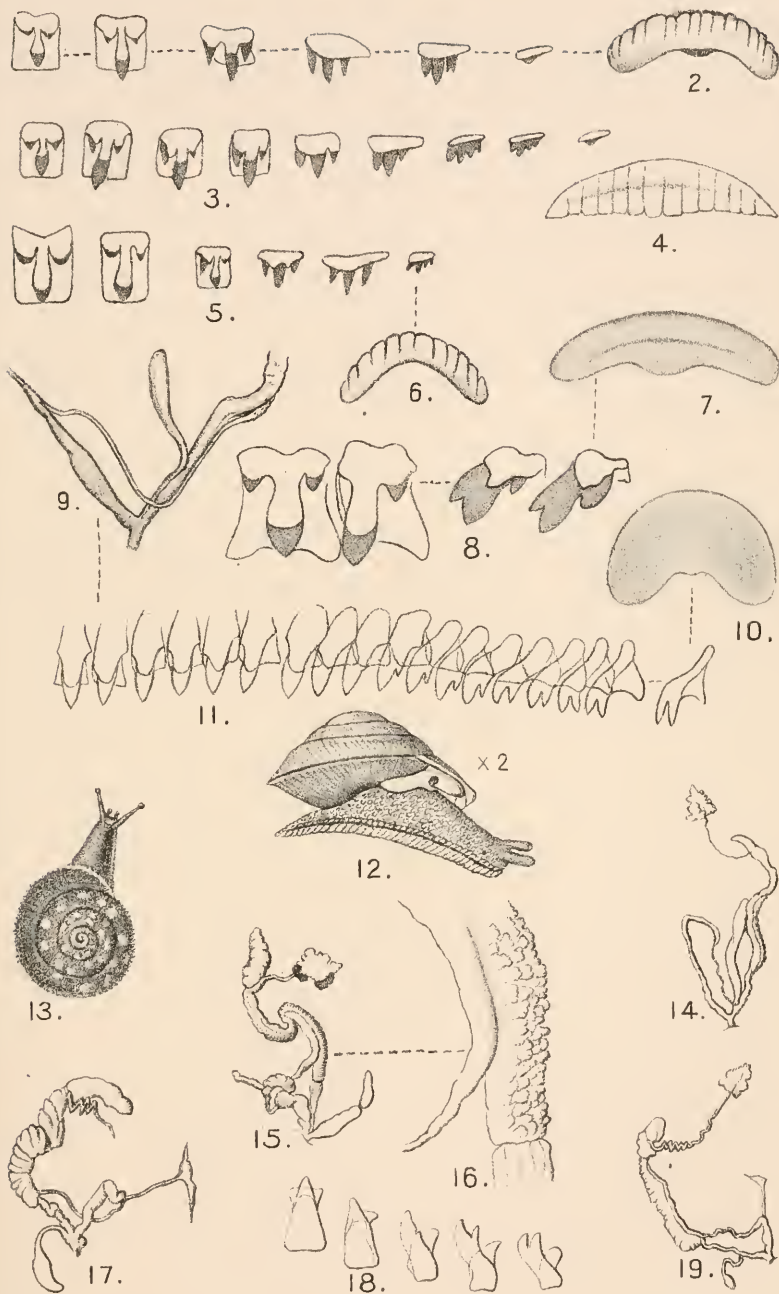
53



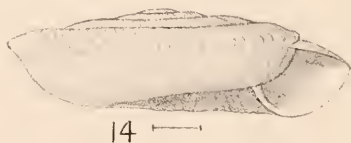
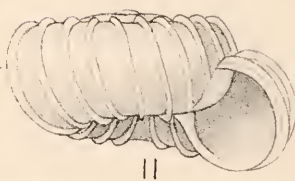
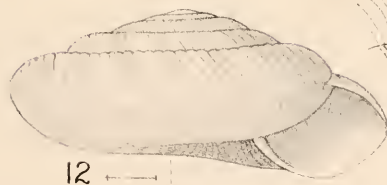
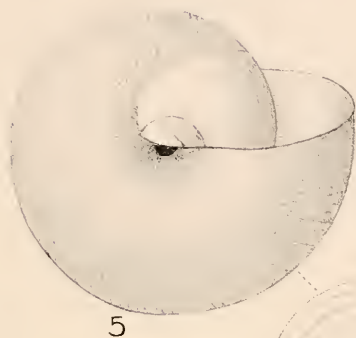
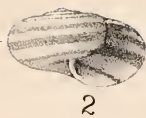
54

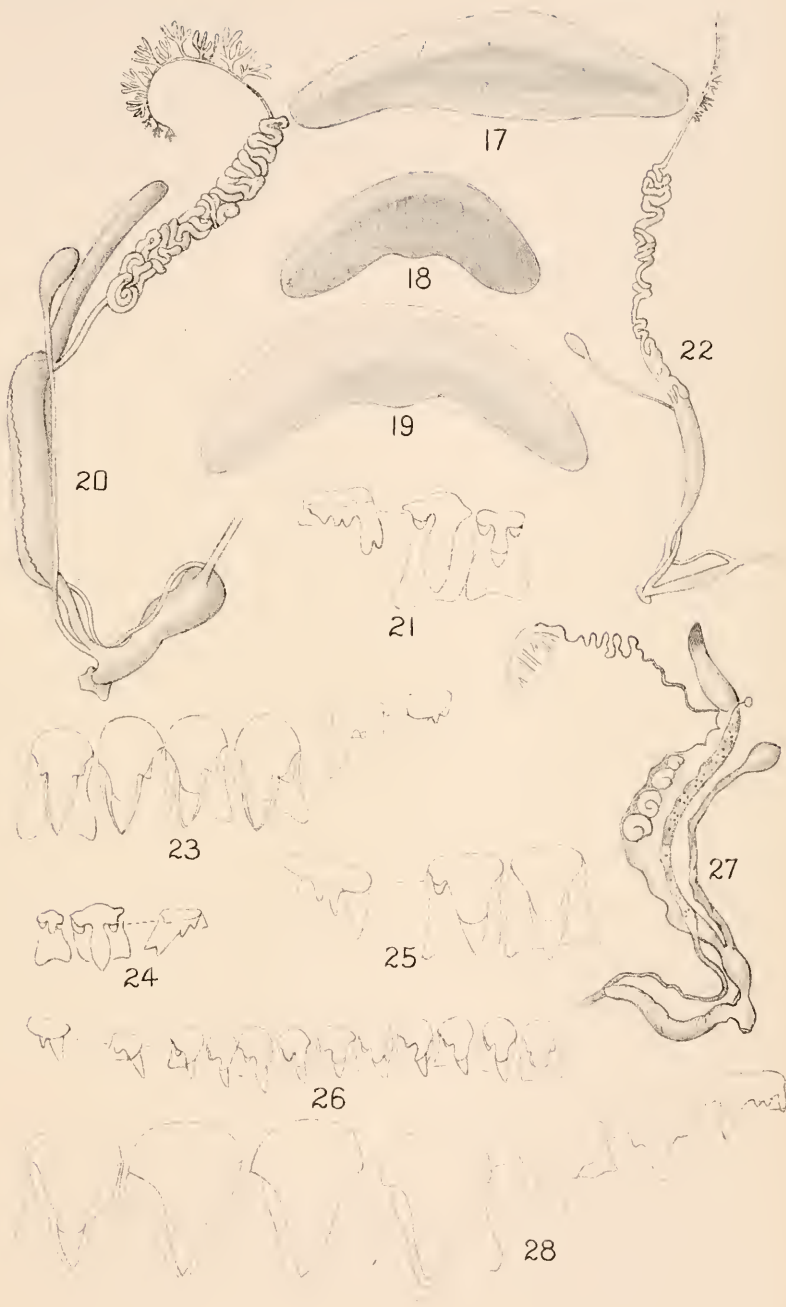


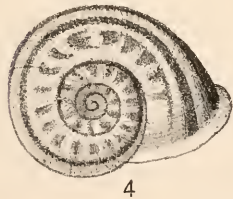
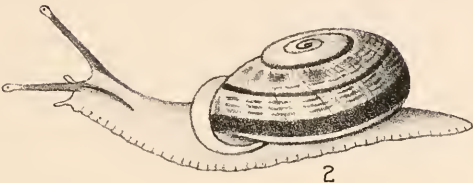
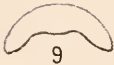
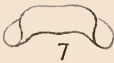
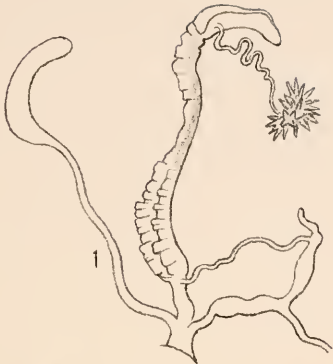


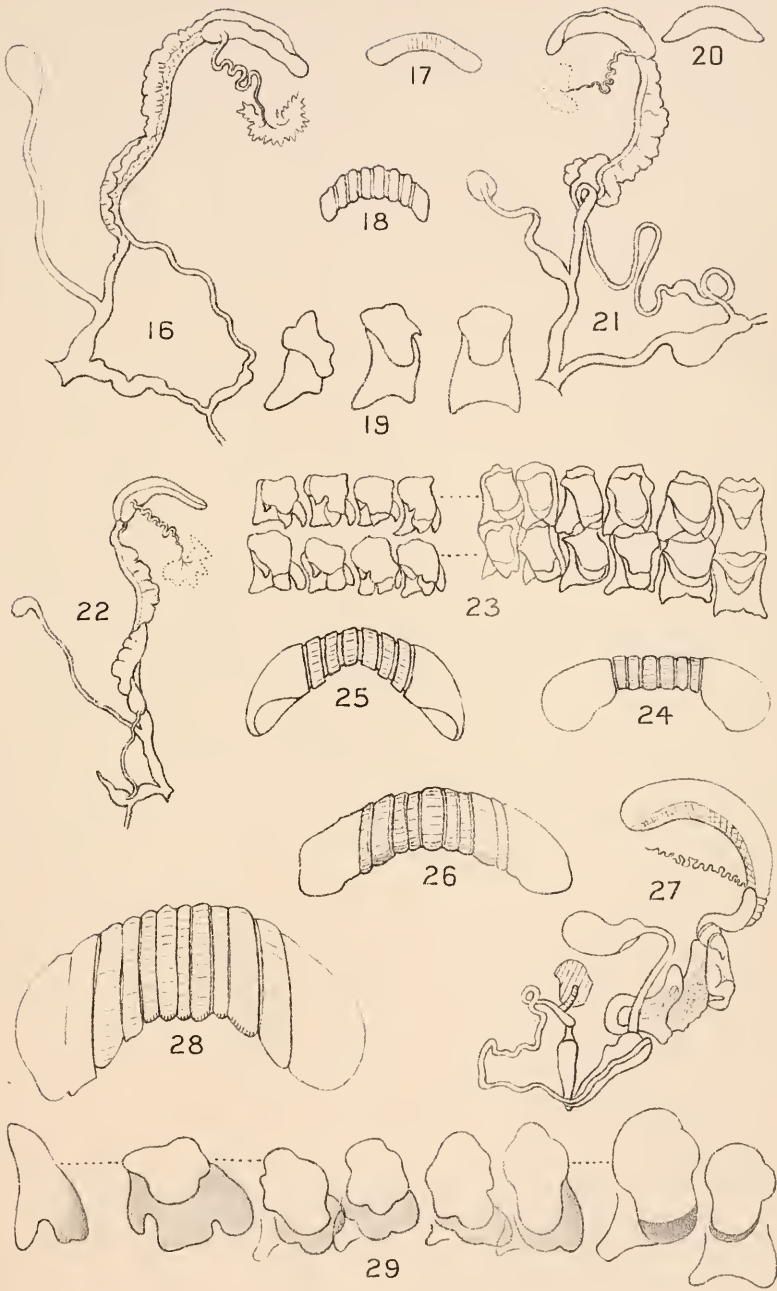


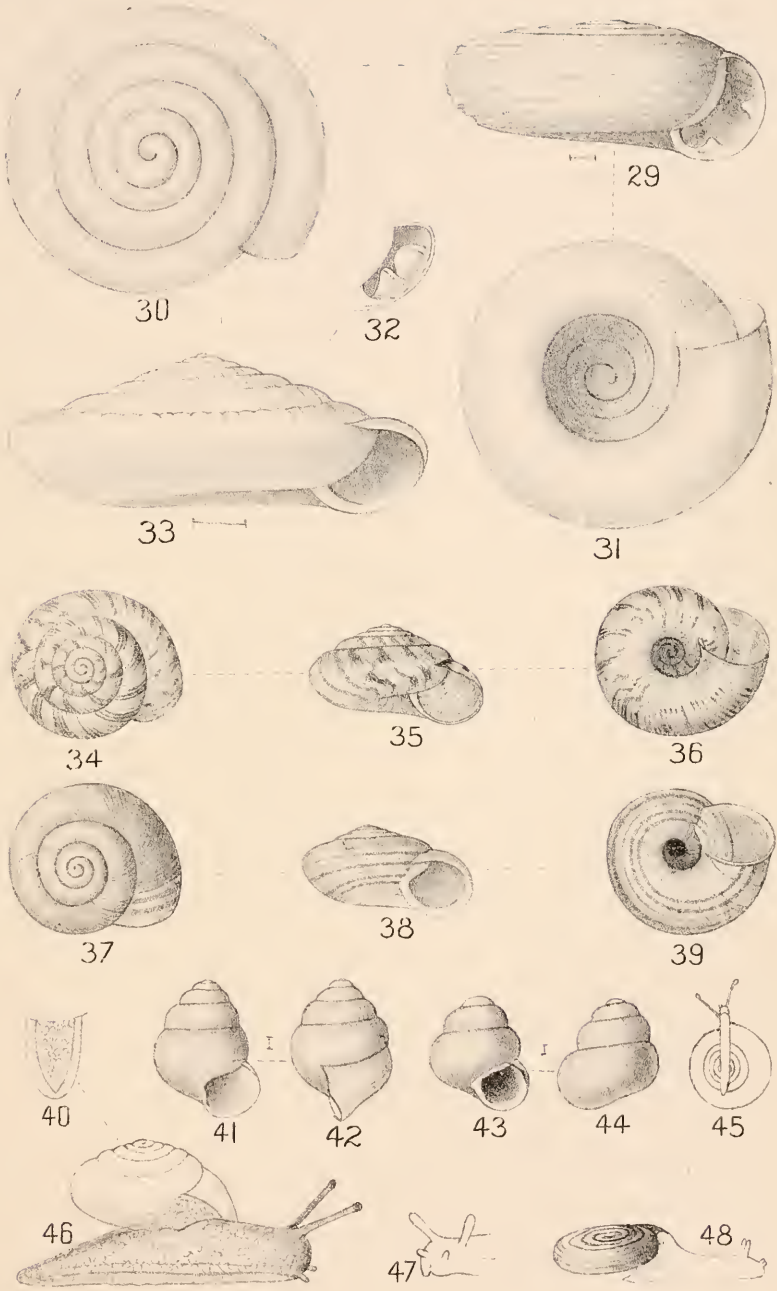


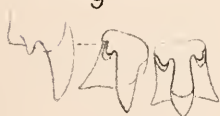
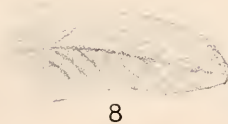
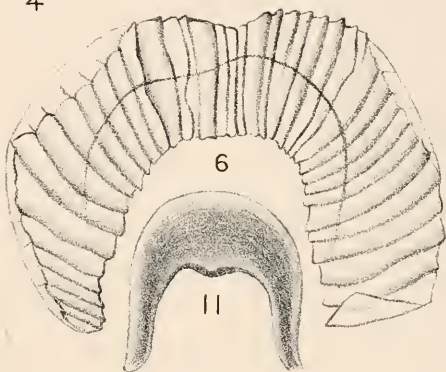
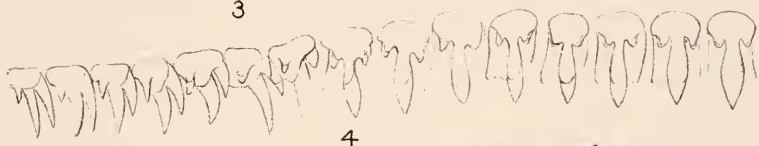
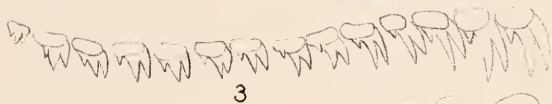
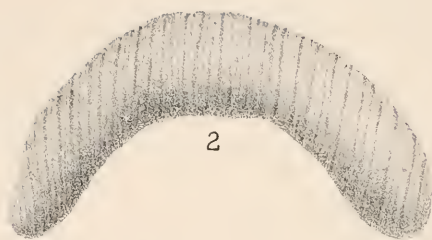


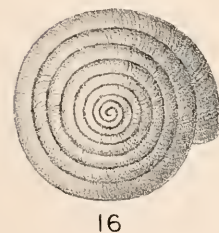
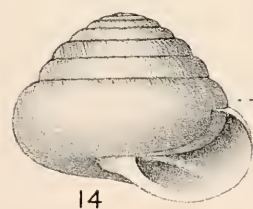
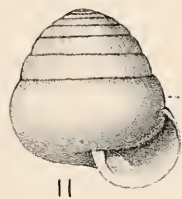


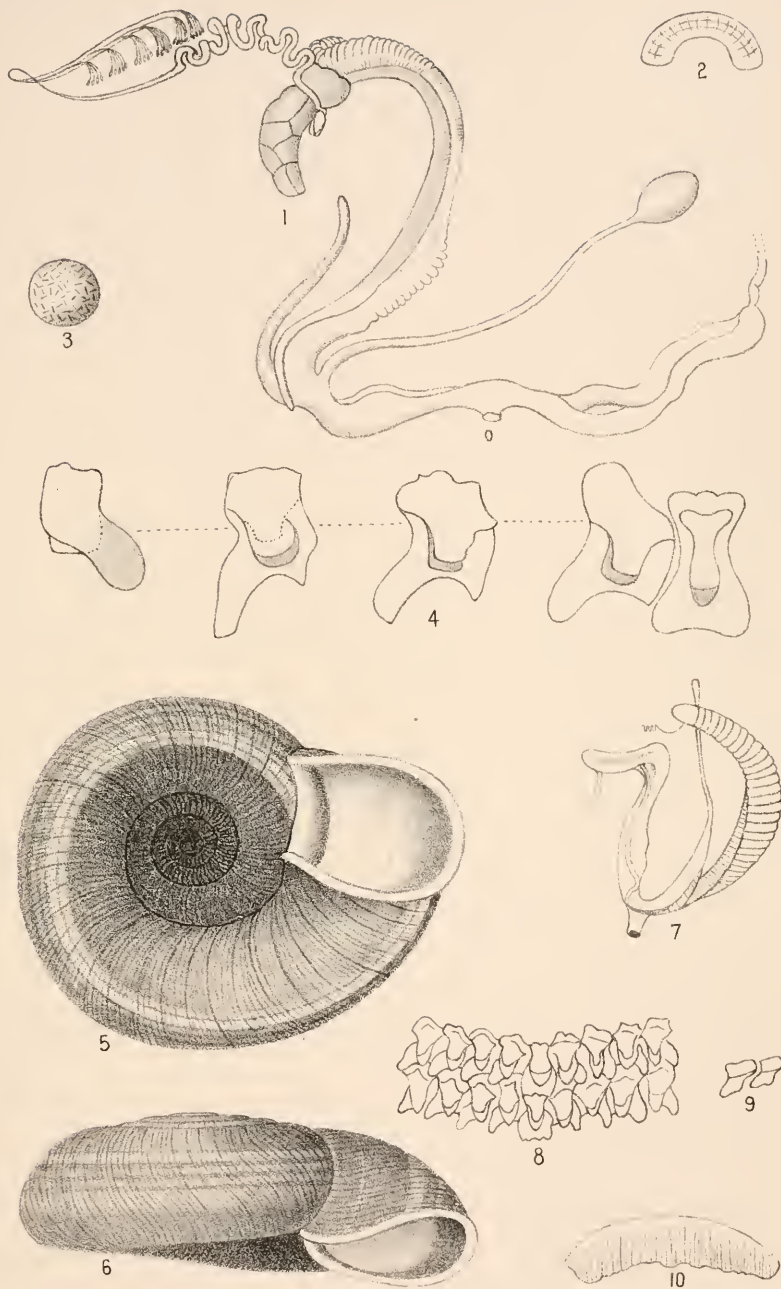




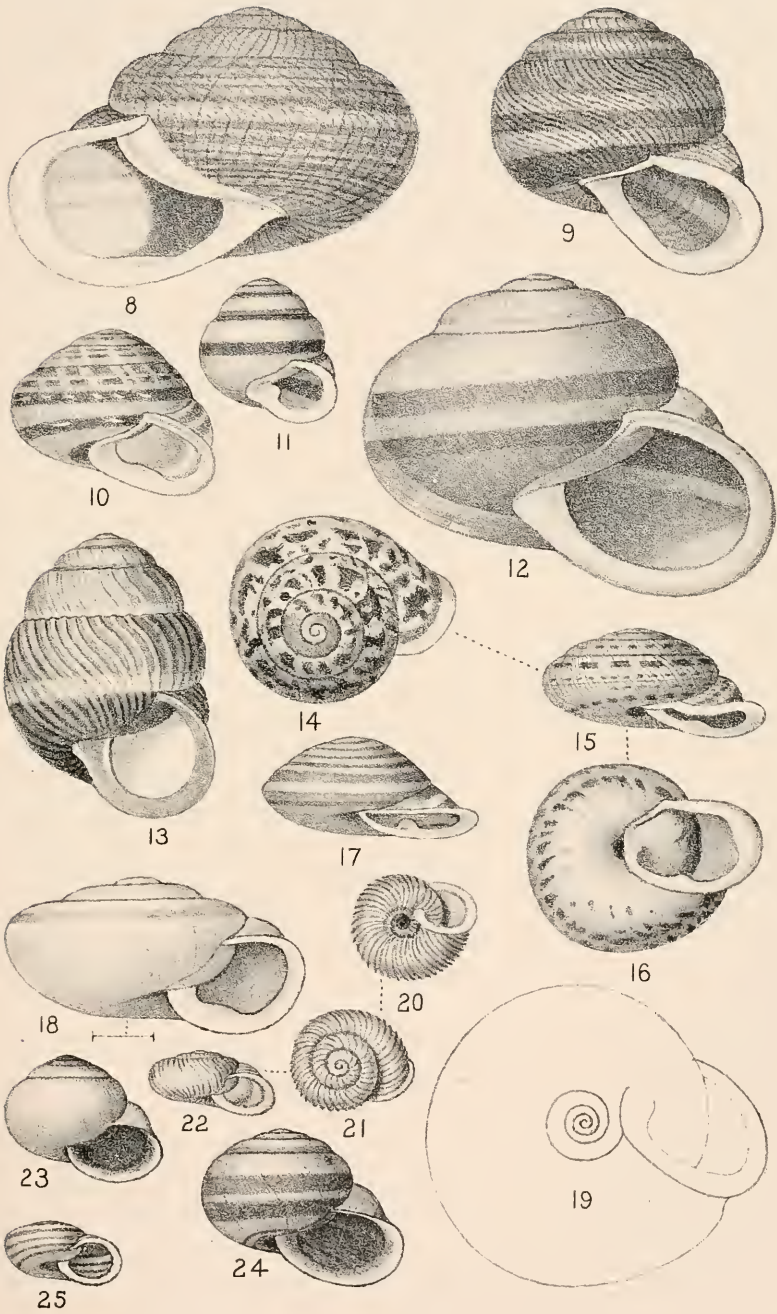


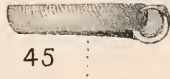
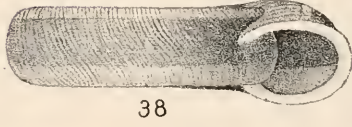
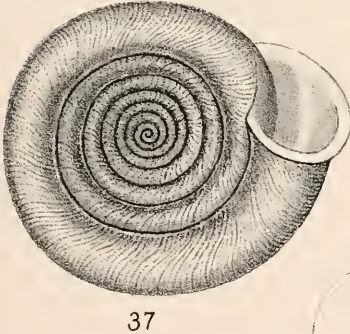
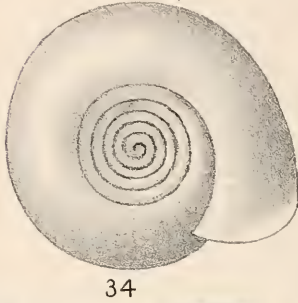
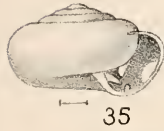
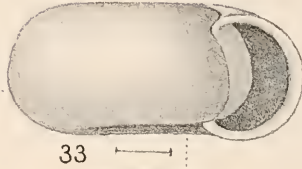
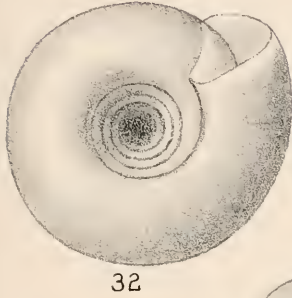


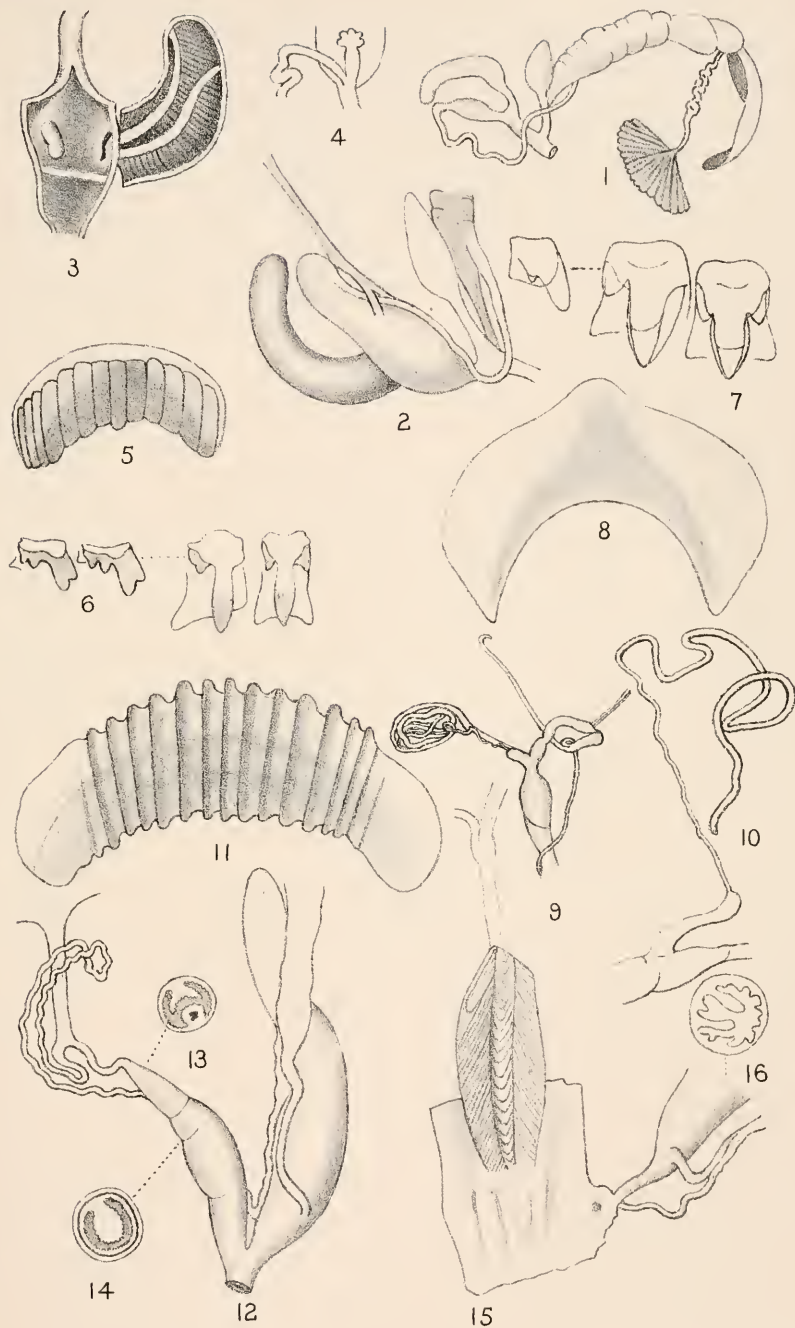


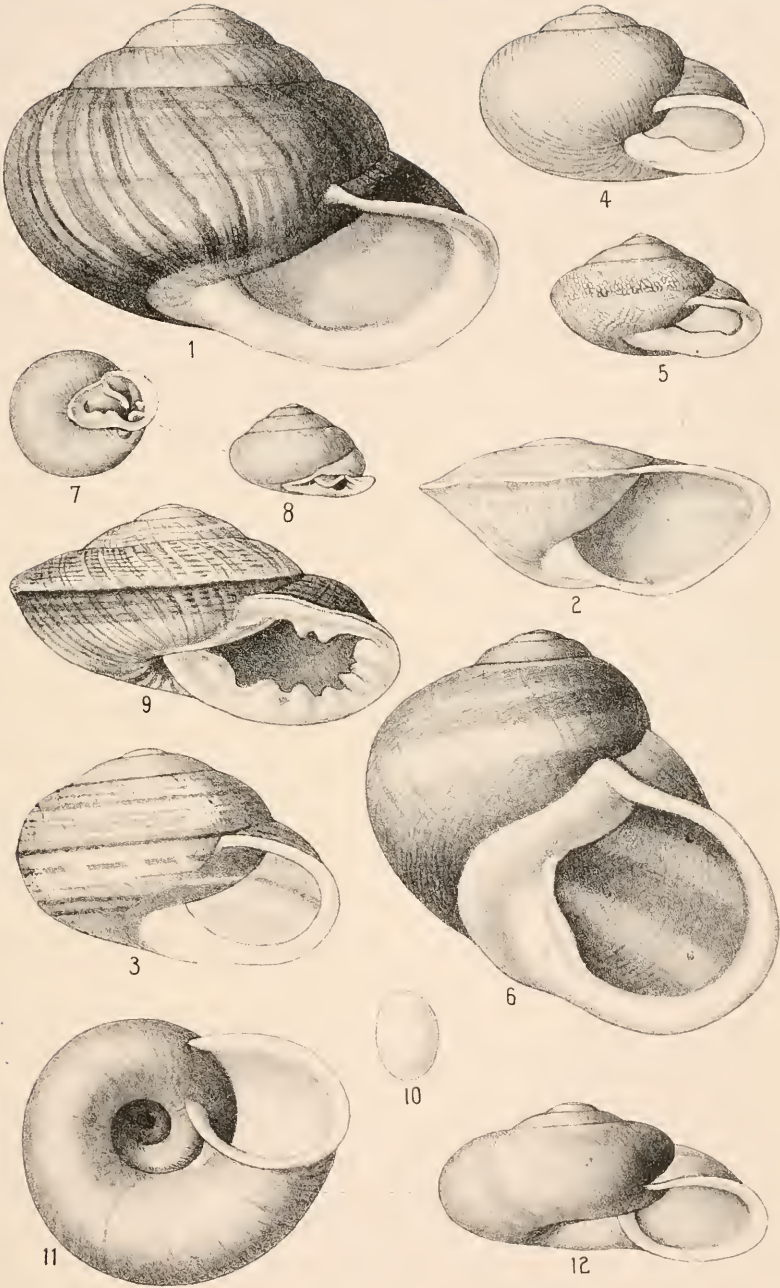


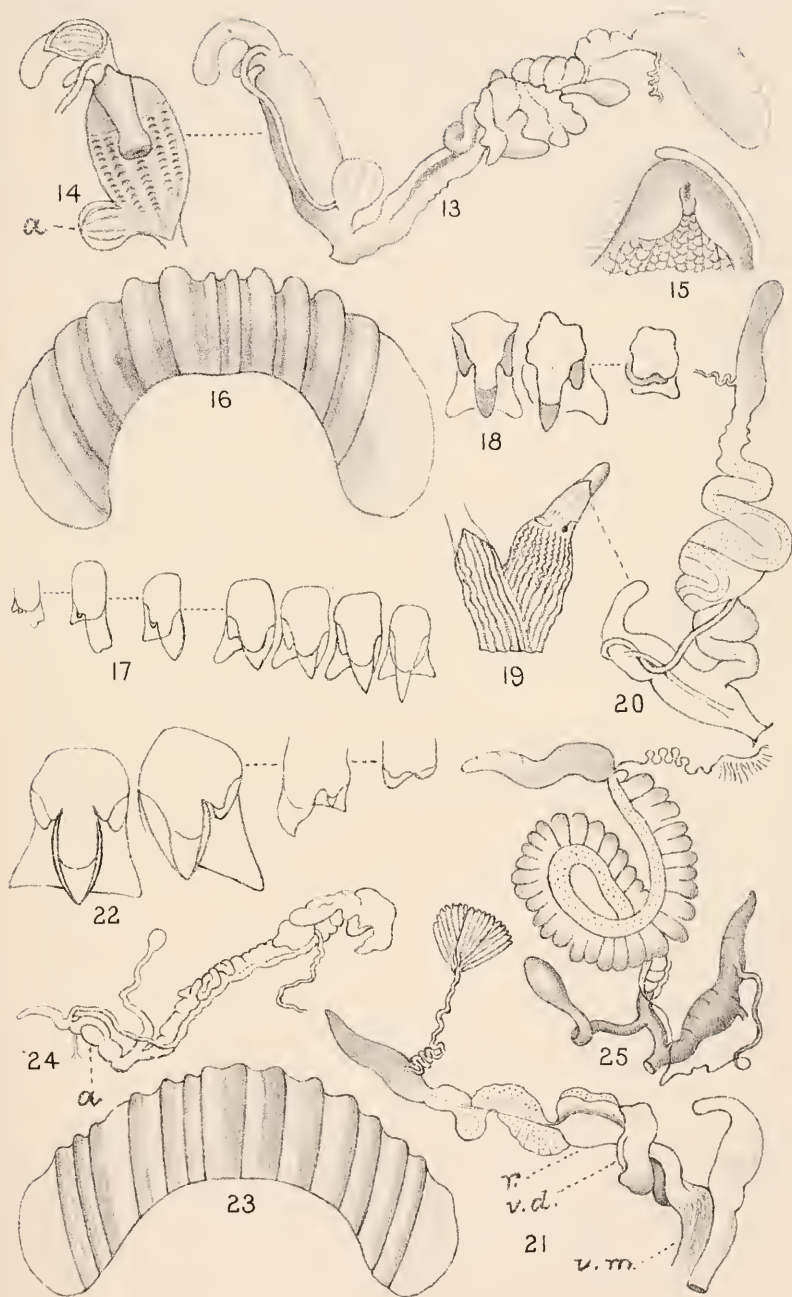


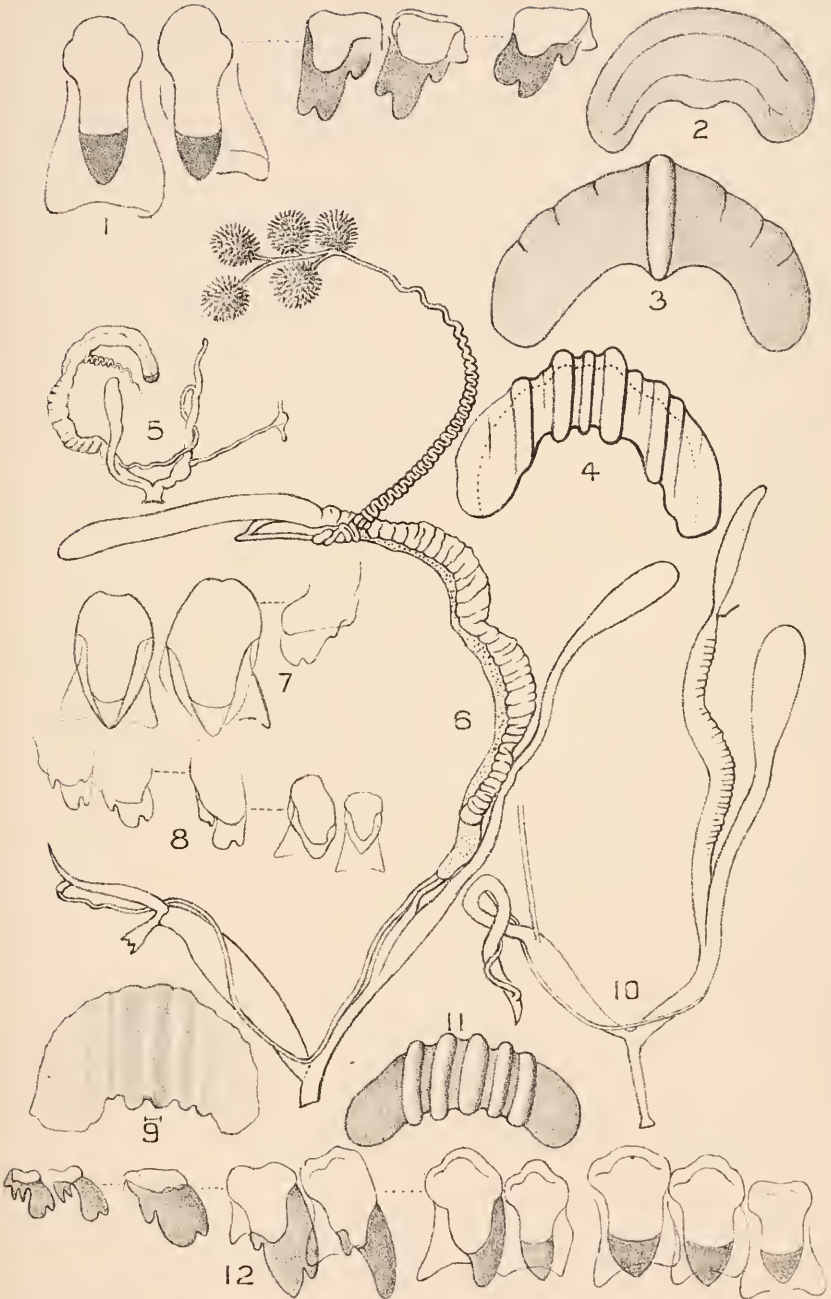


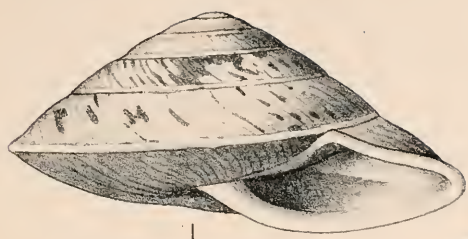












1



2



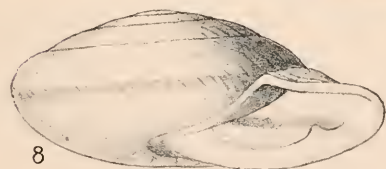
3



6



7



8



10



9

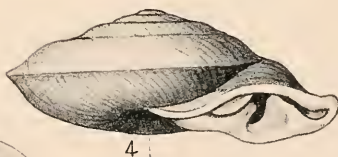


11



12

13

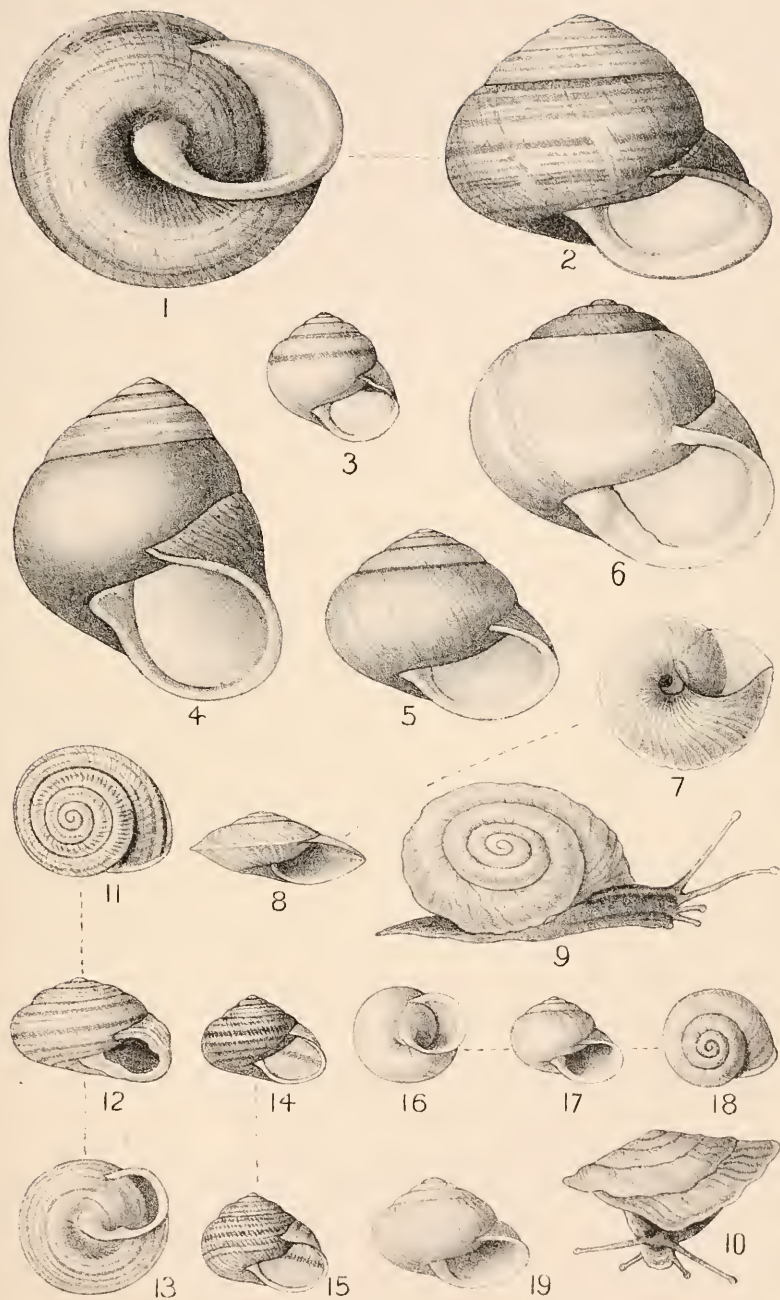


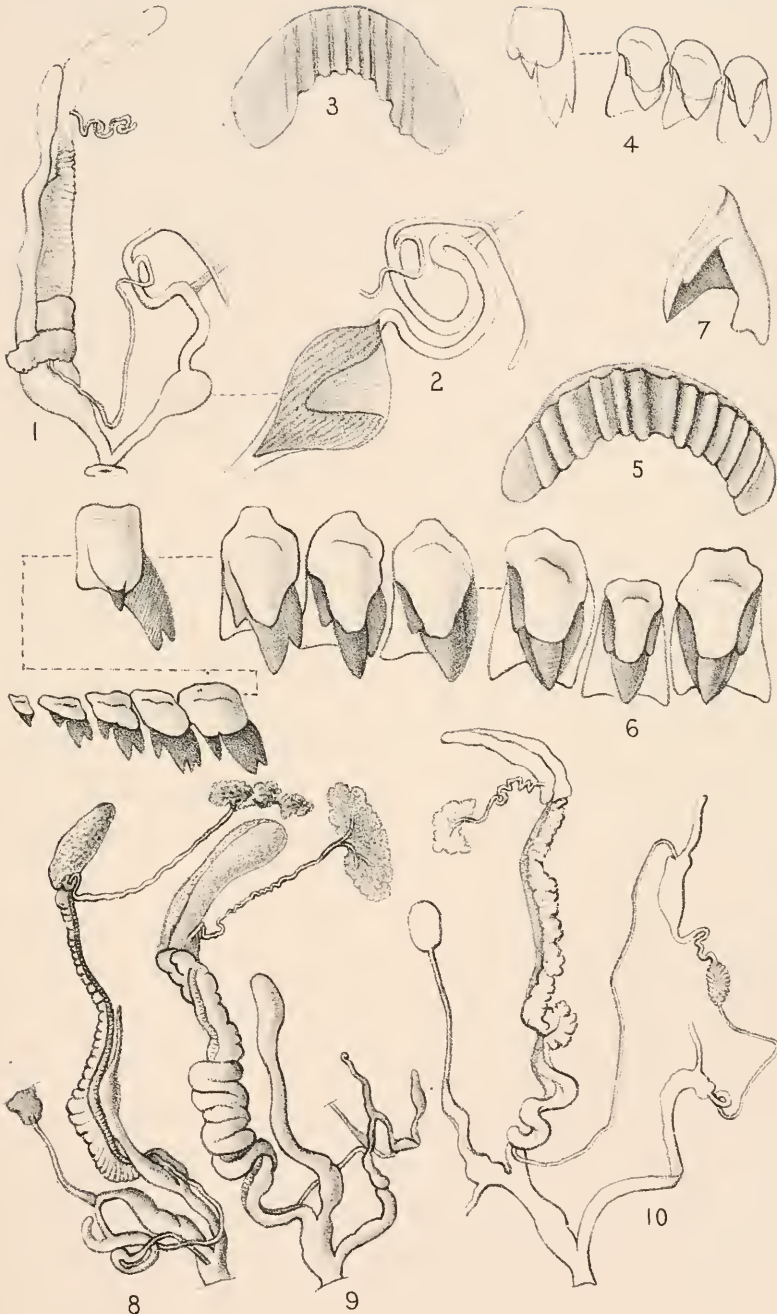
4

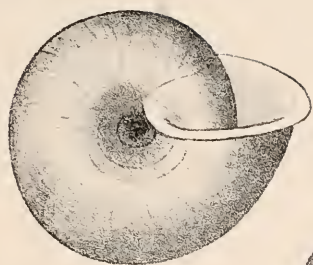


5





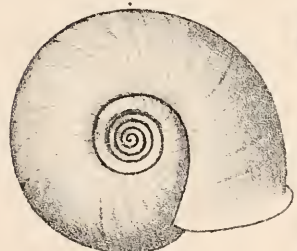




1



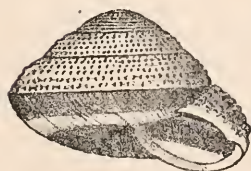
2



3



12



16



6



7



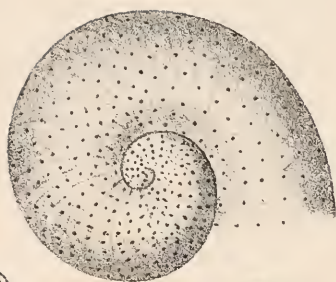
11



13



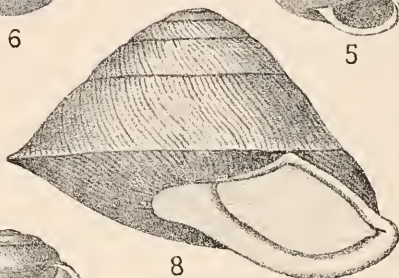
14



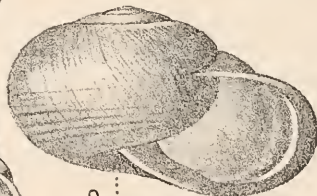
4



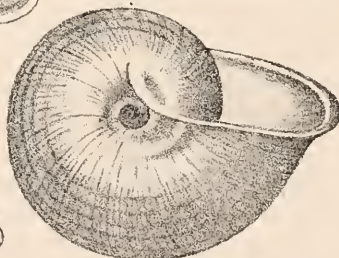
5



8



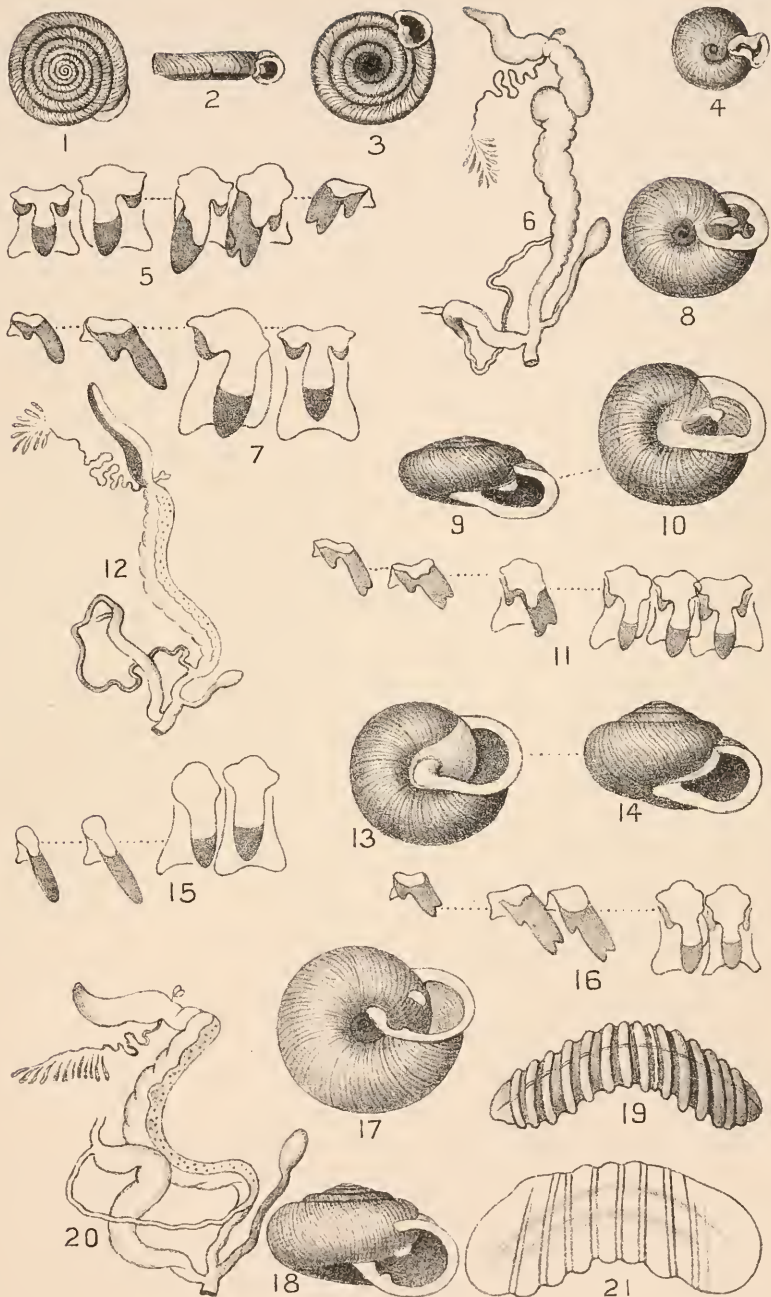
9

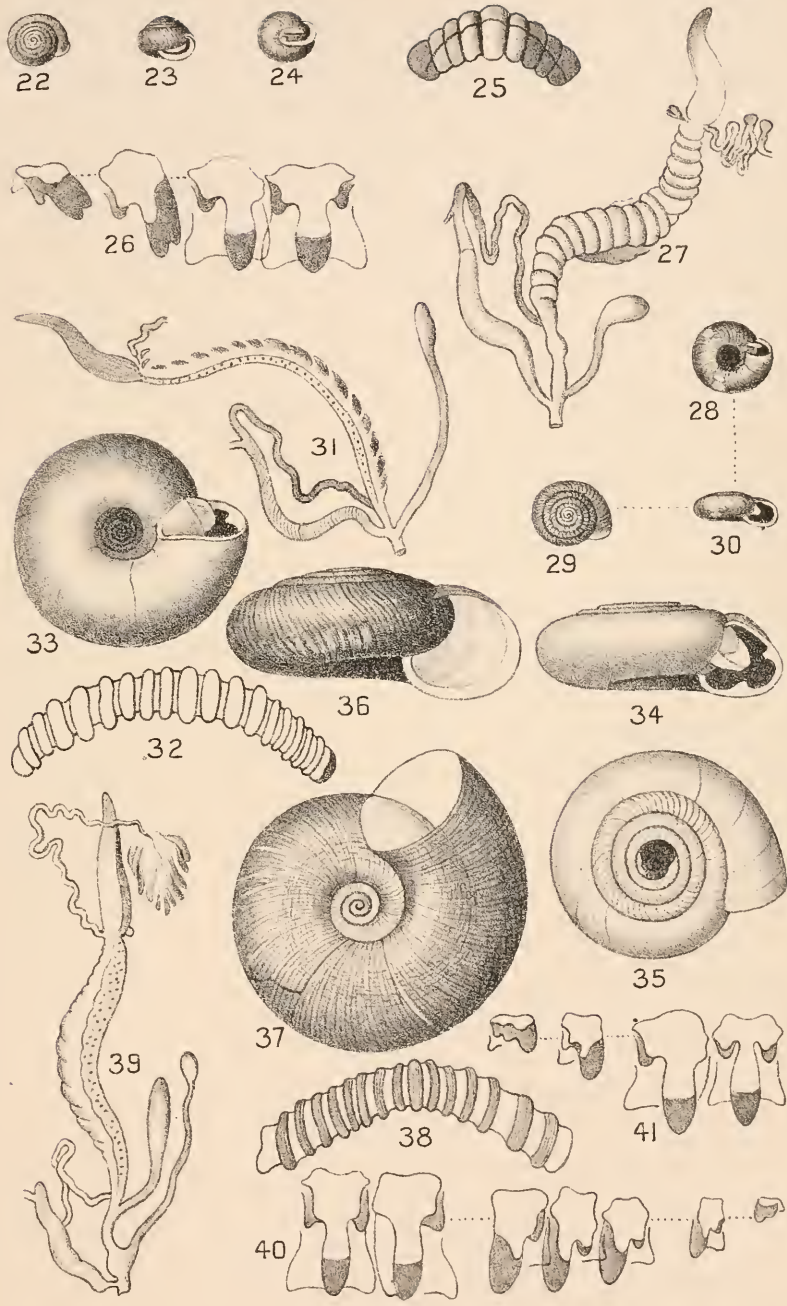


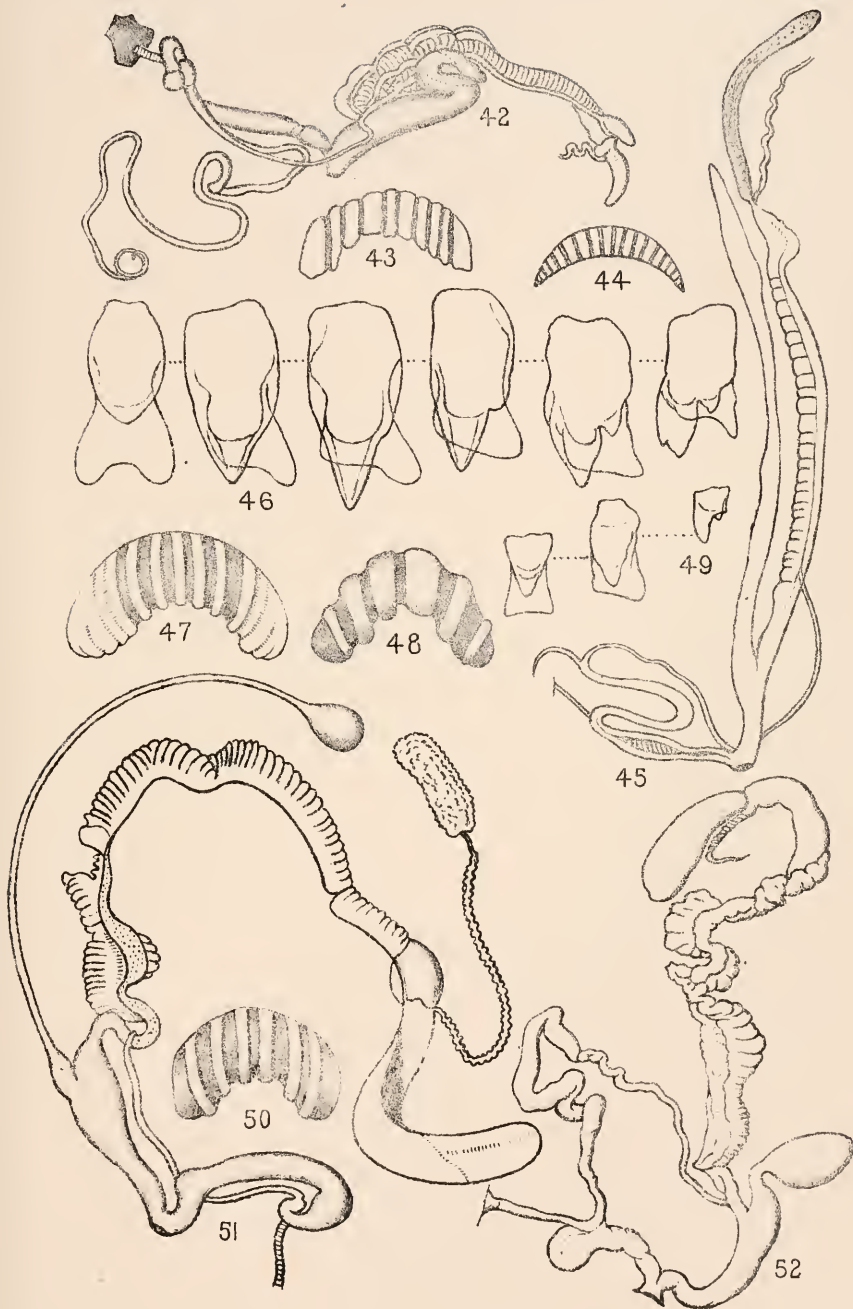
10

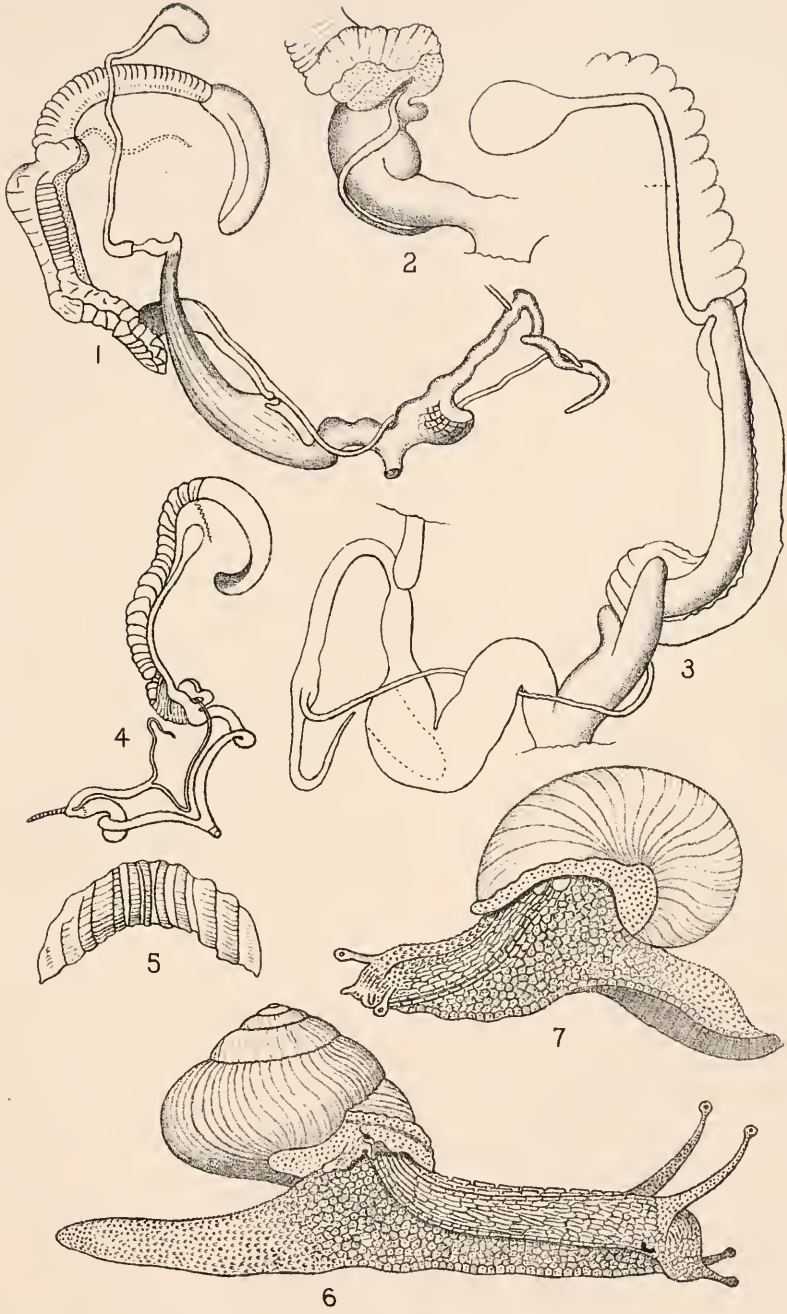


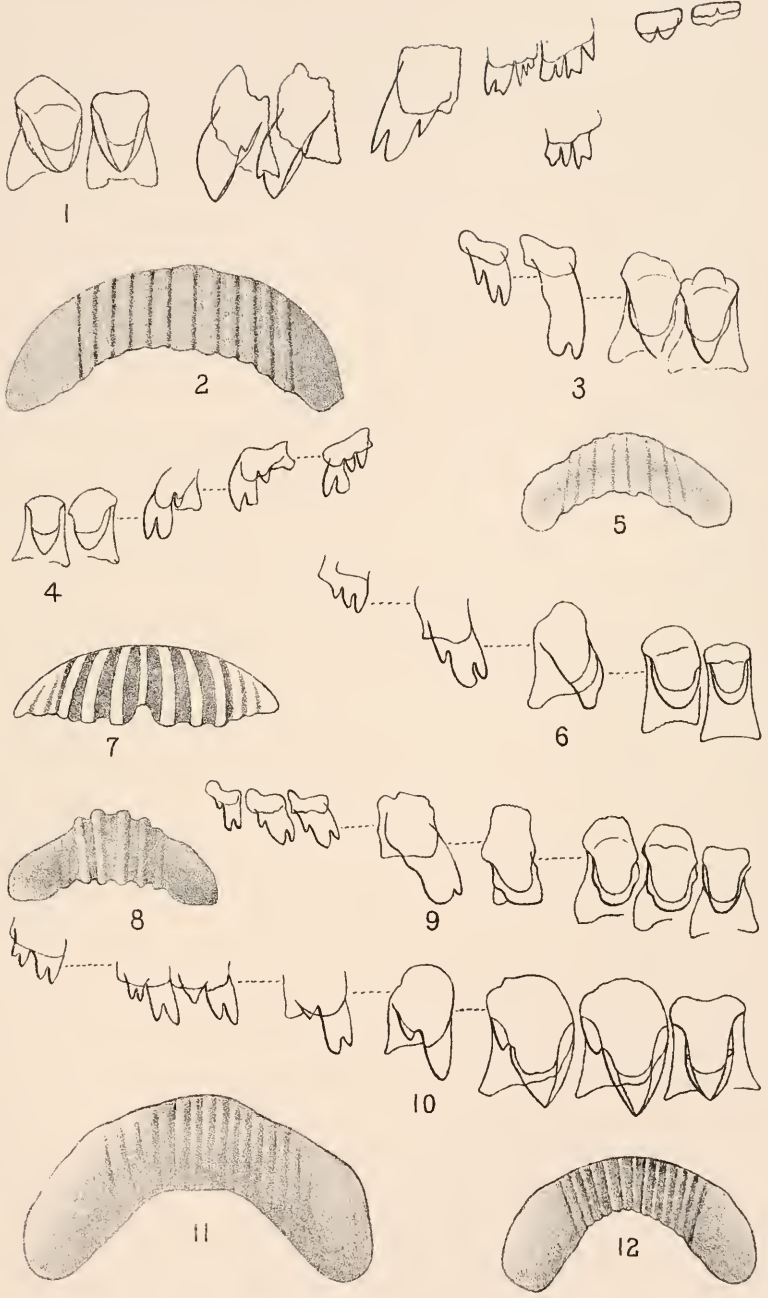
15

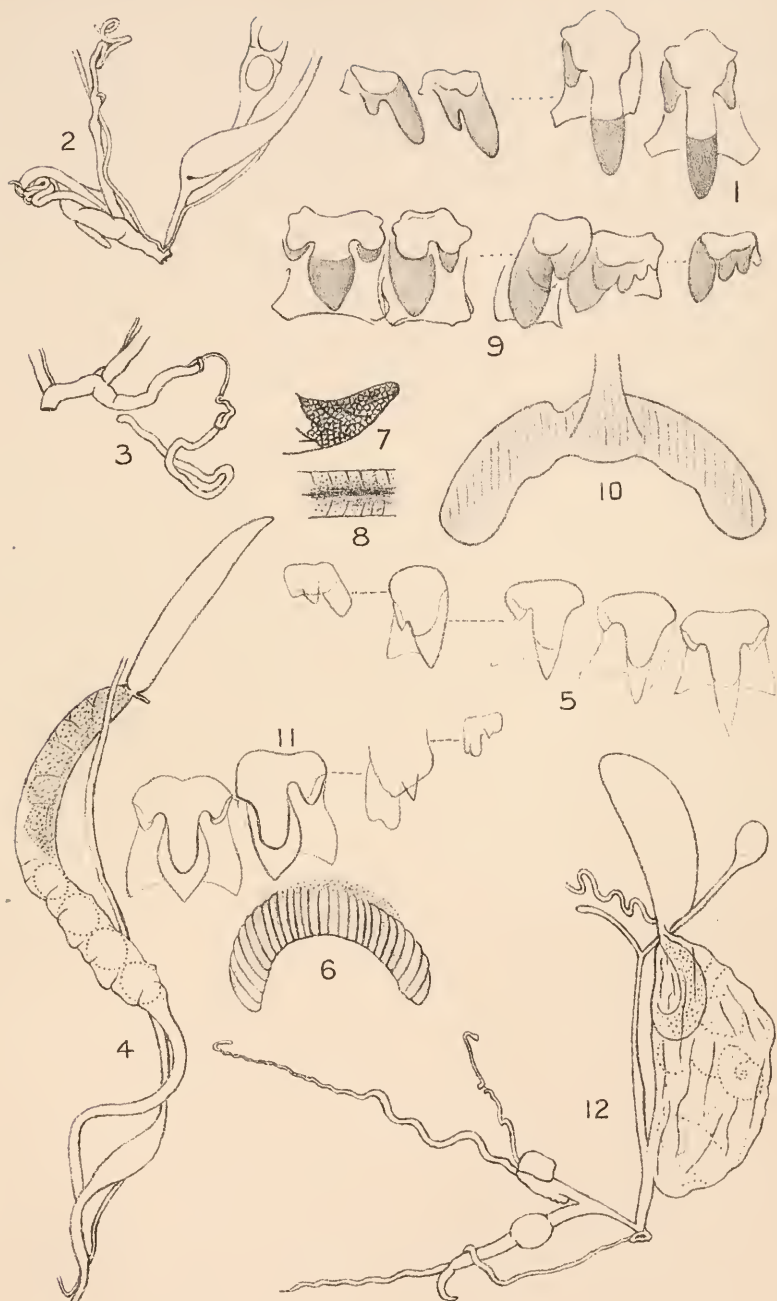


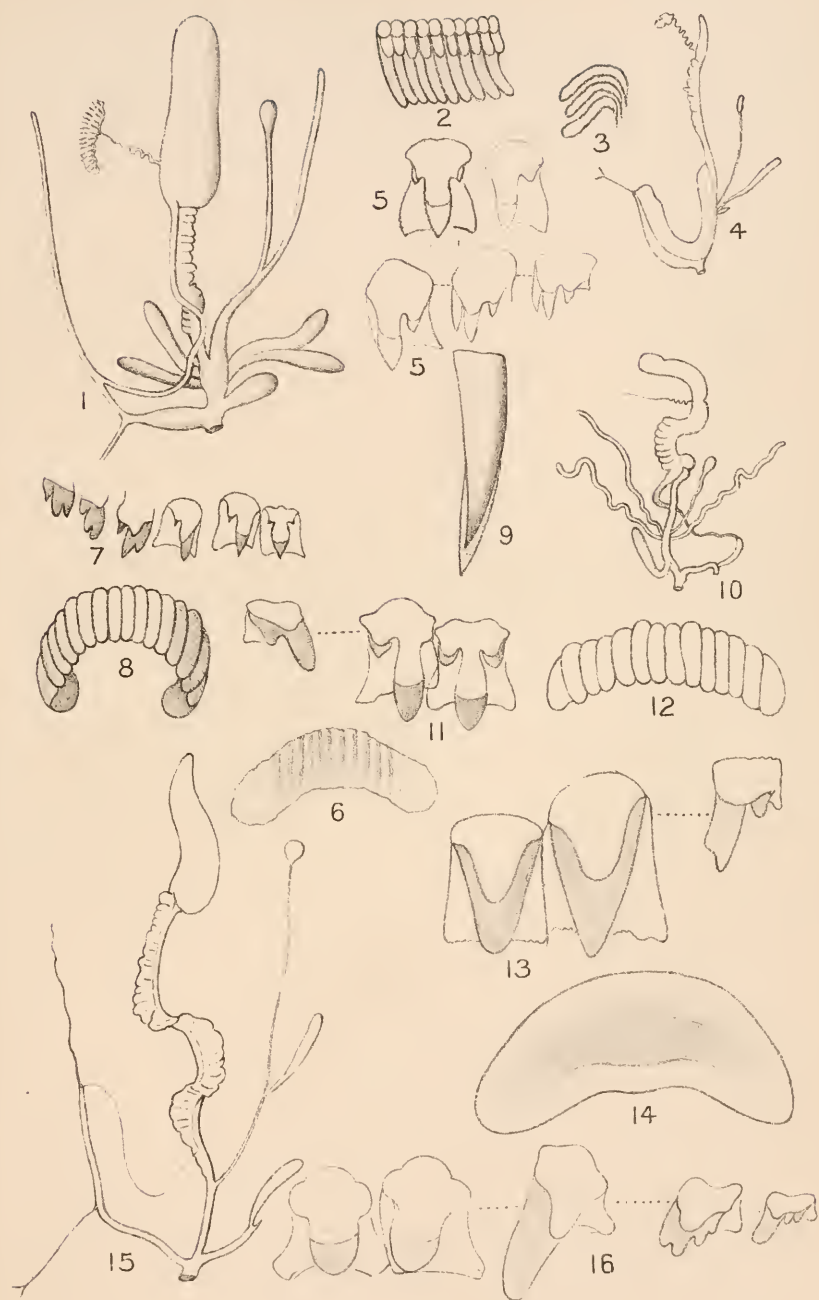




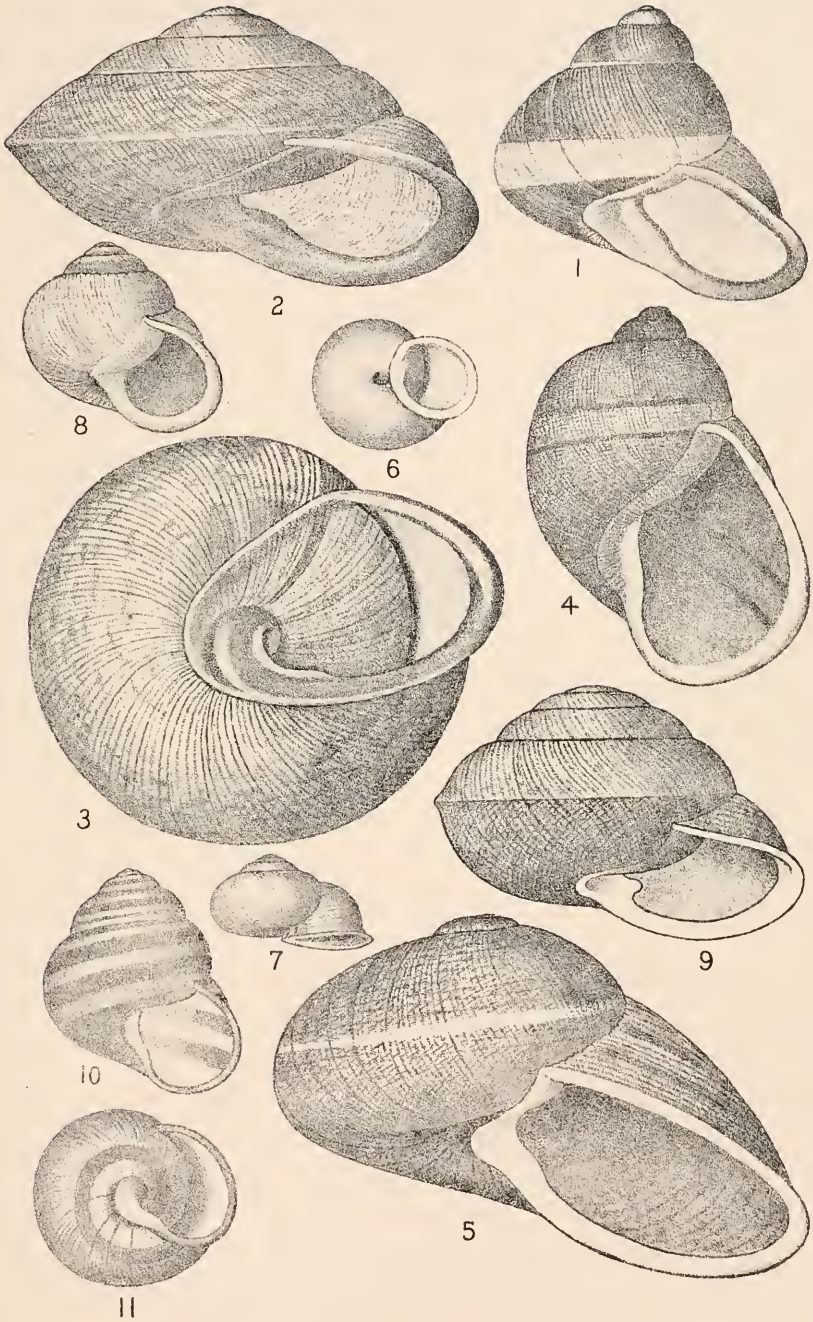


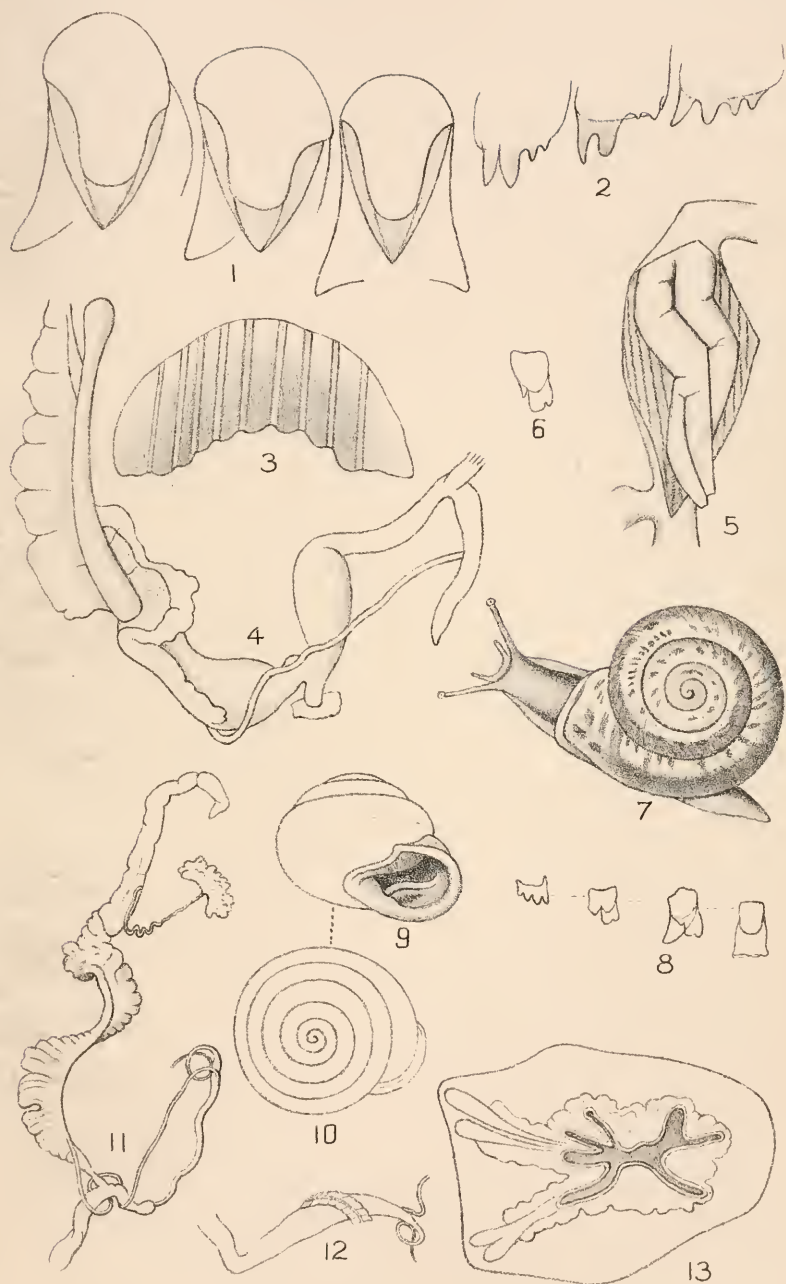


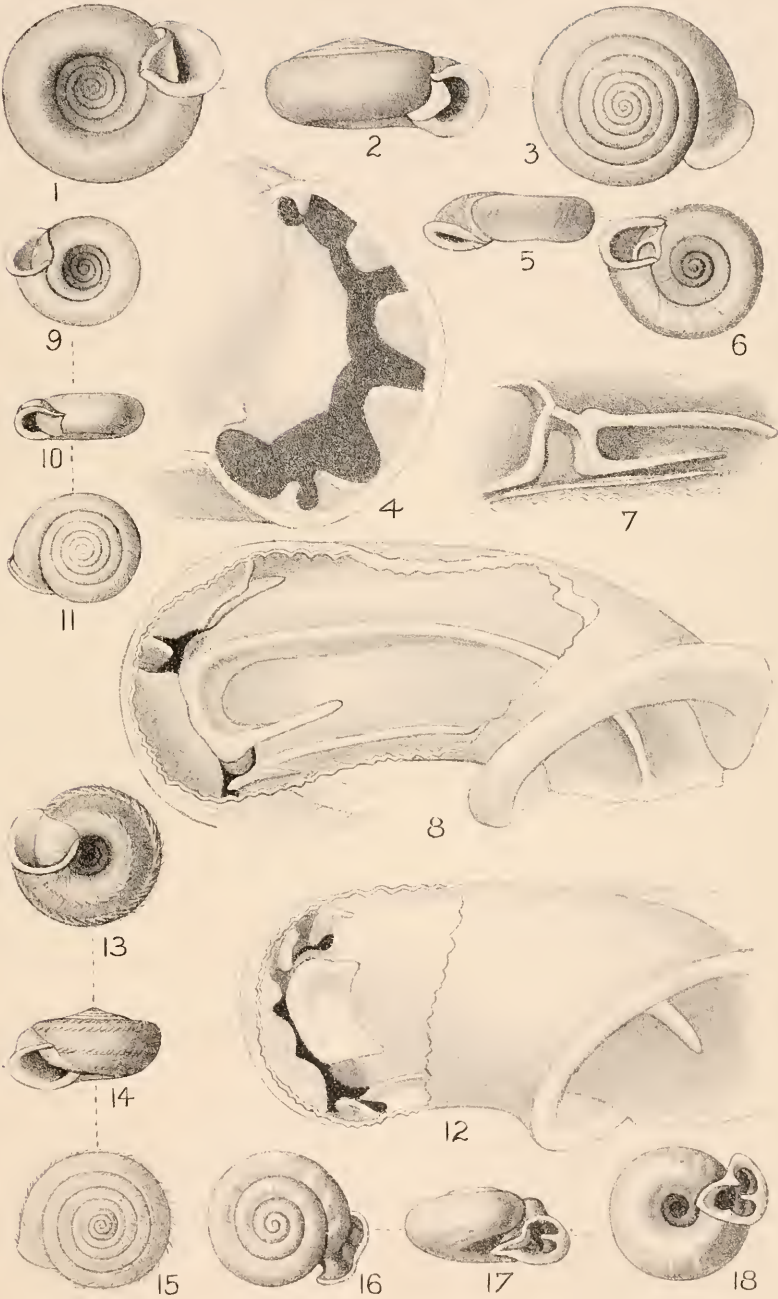


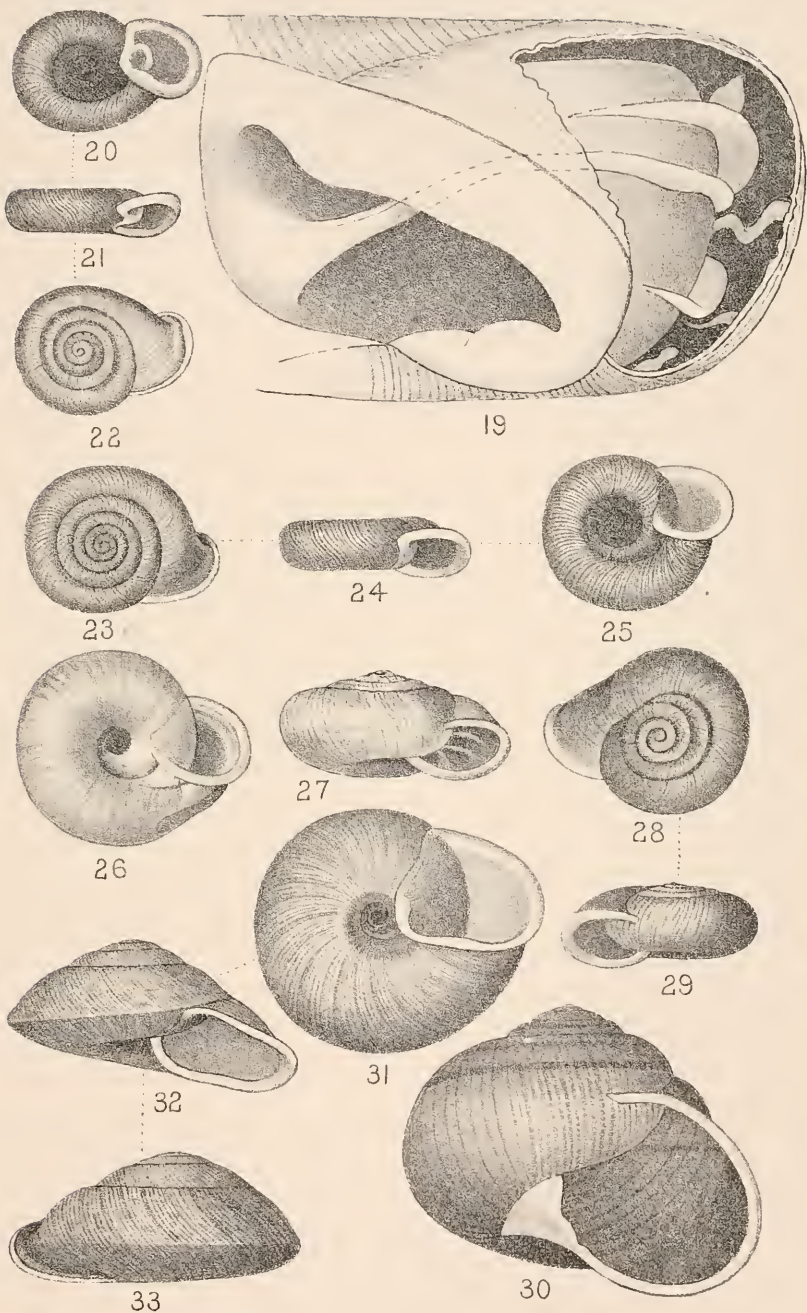


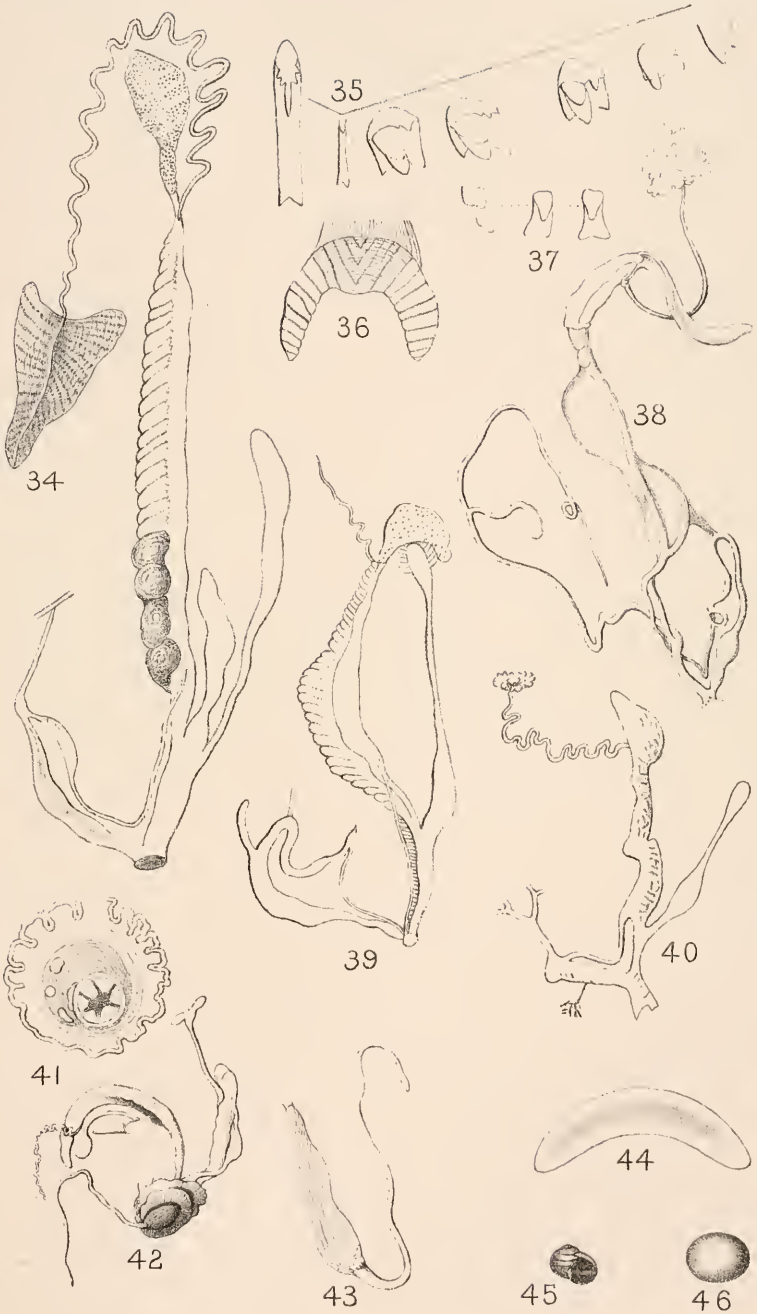


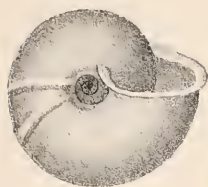












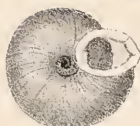
19



20



21



22



23



24



26



27



28



25



29



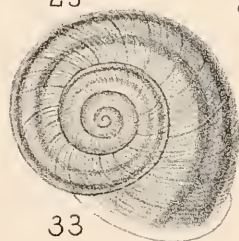
30



31



32



33



34



35



37



36



39



38



41



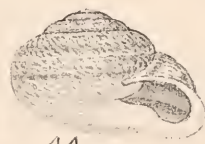
42



40



43



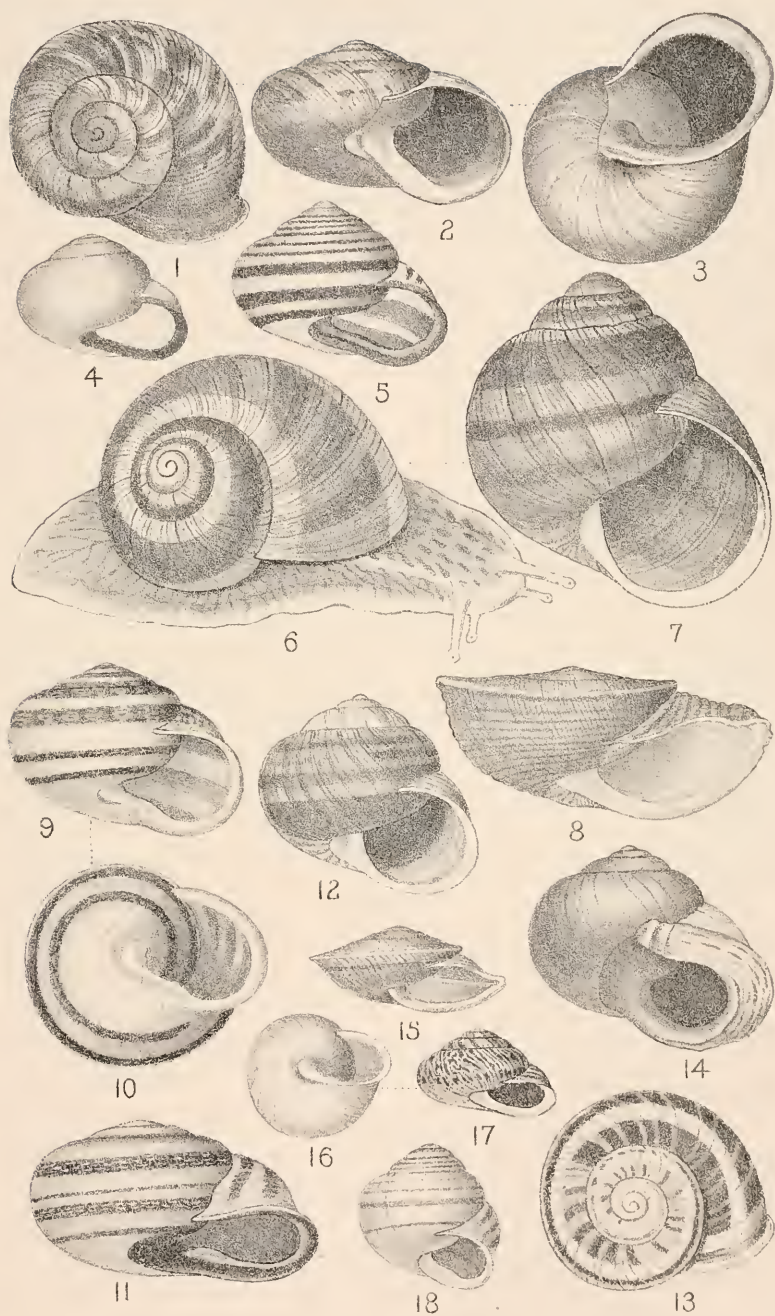
44

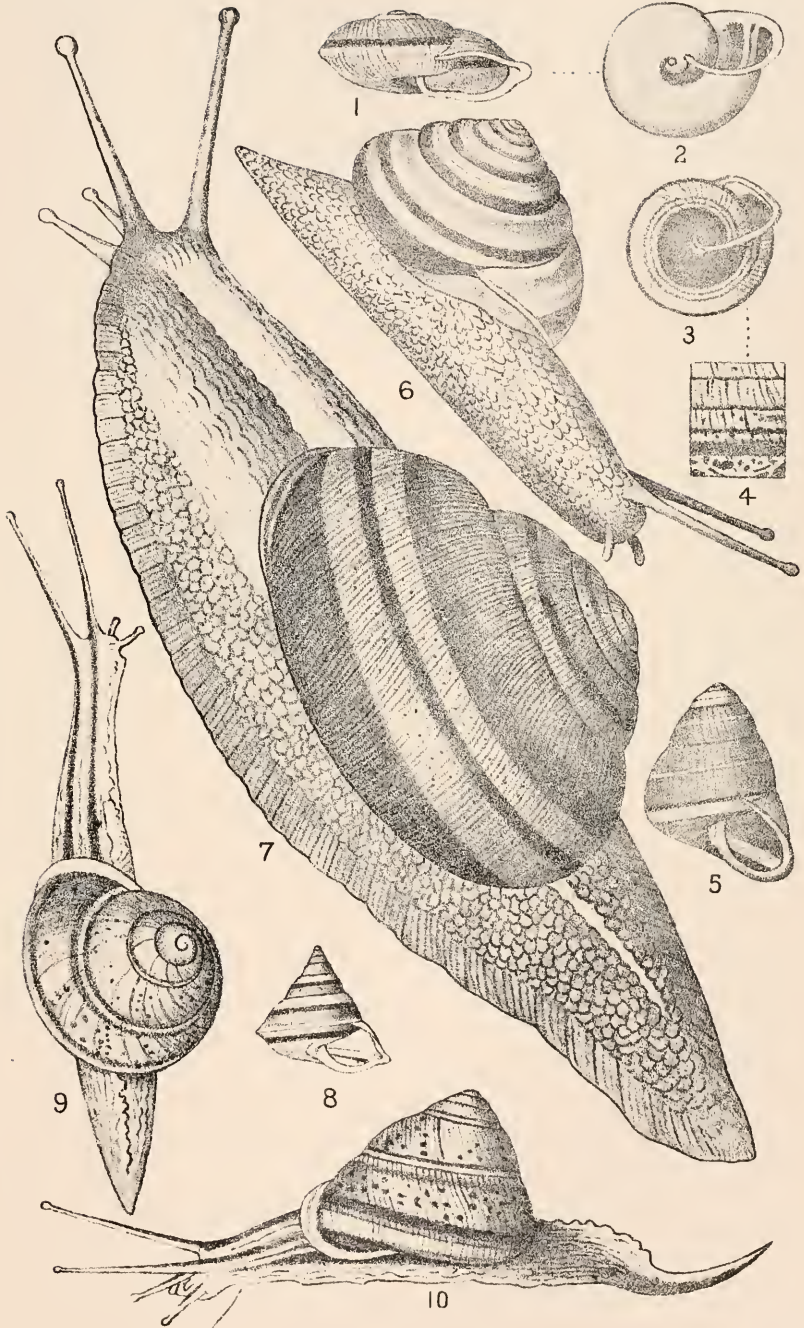


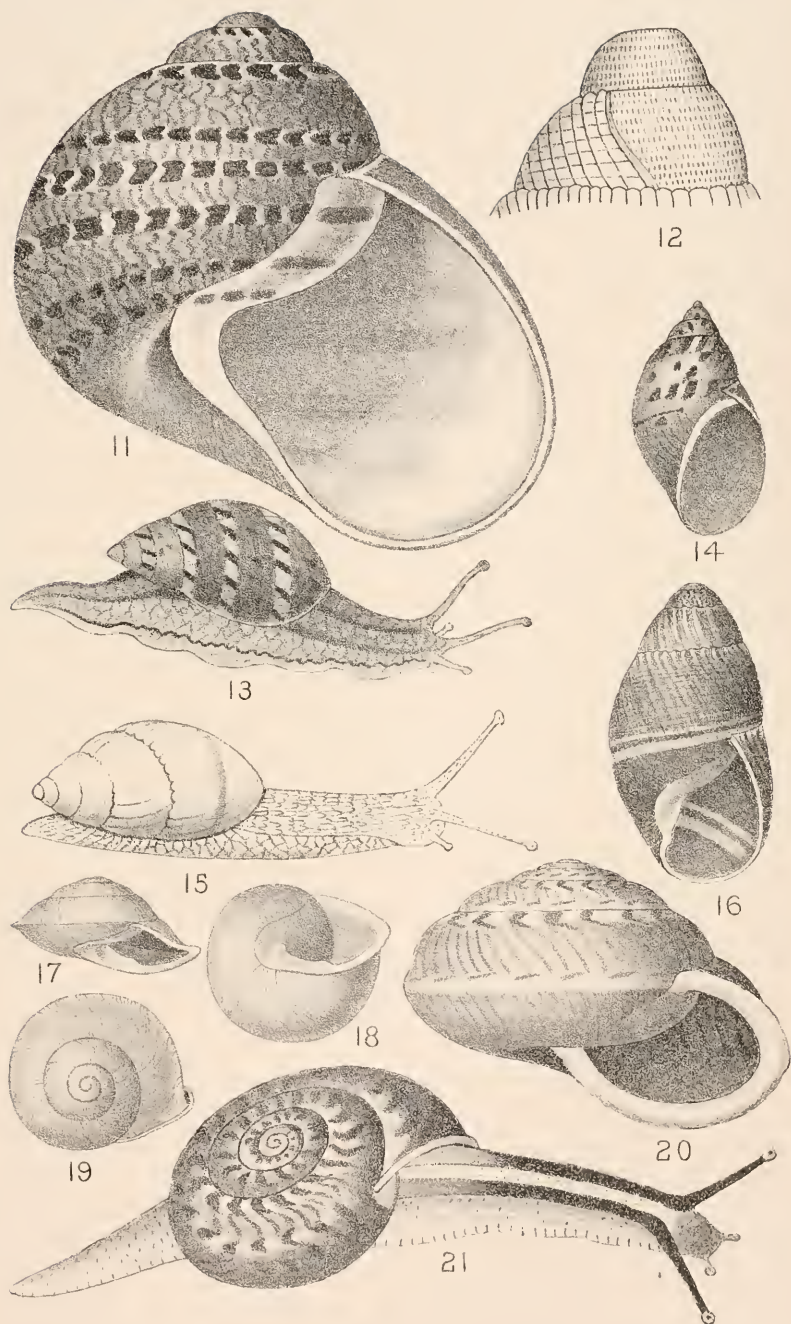
45

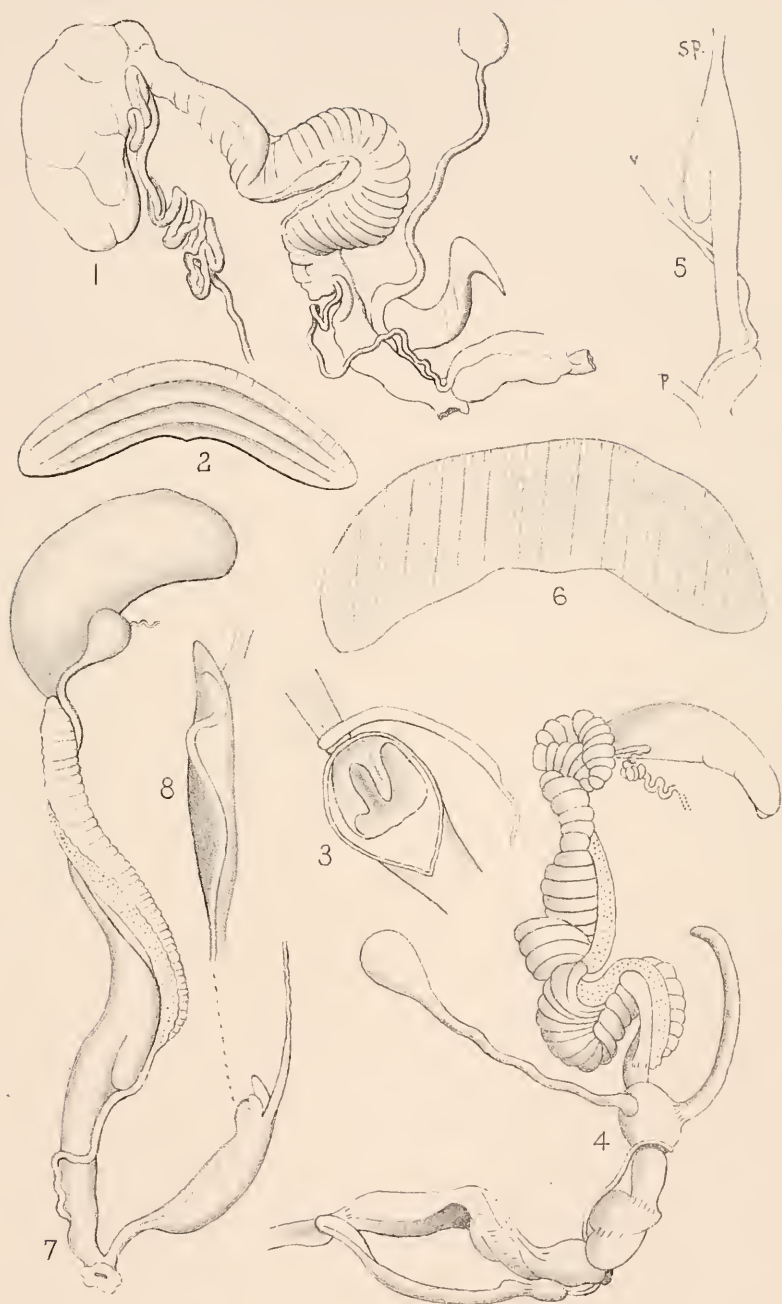


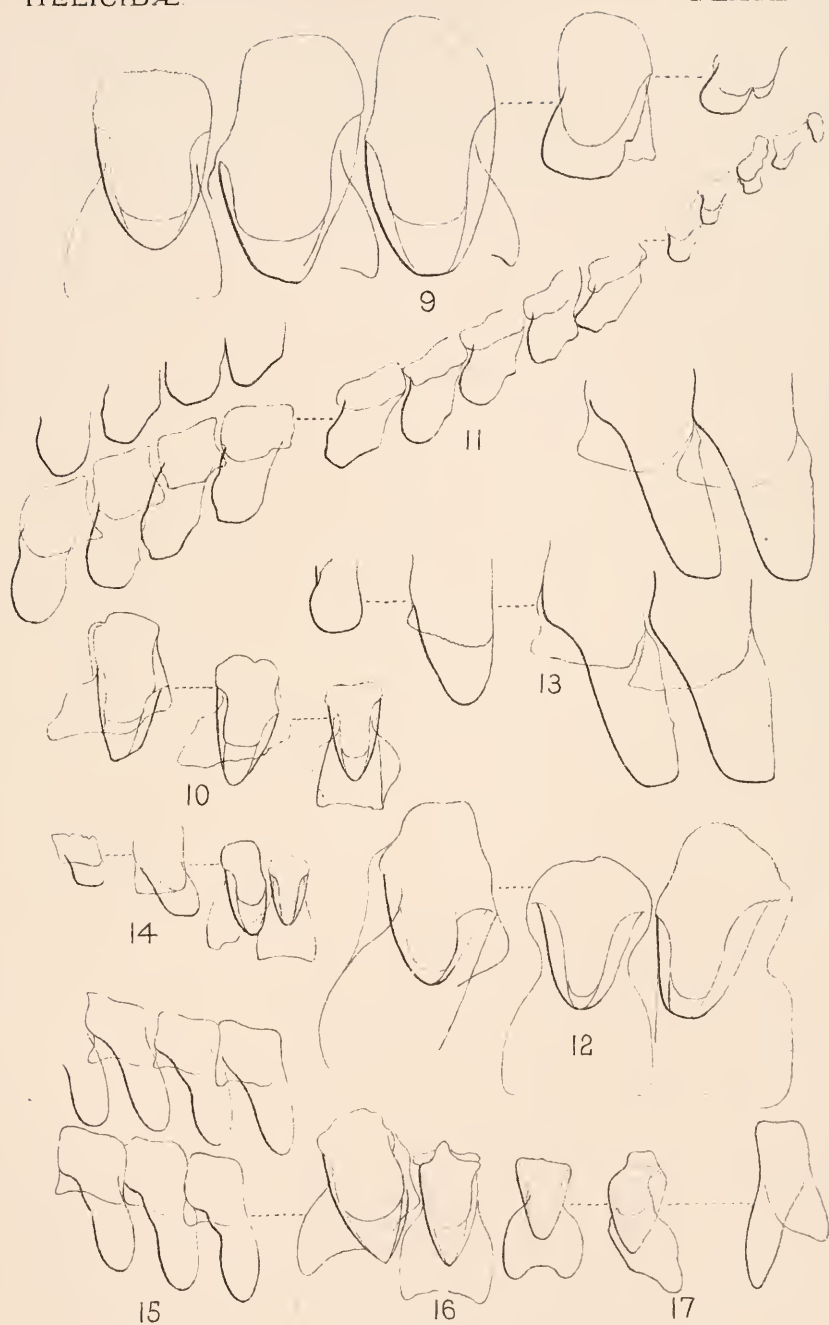
46

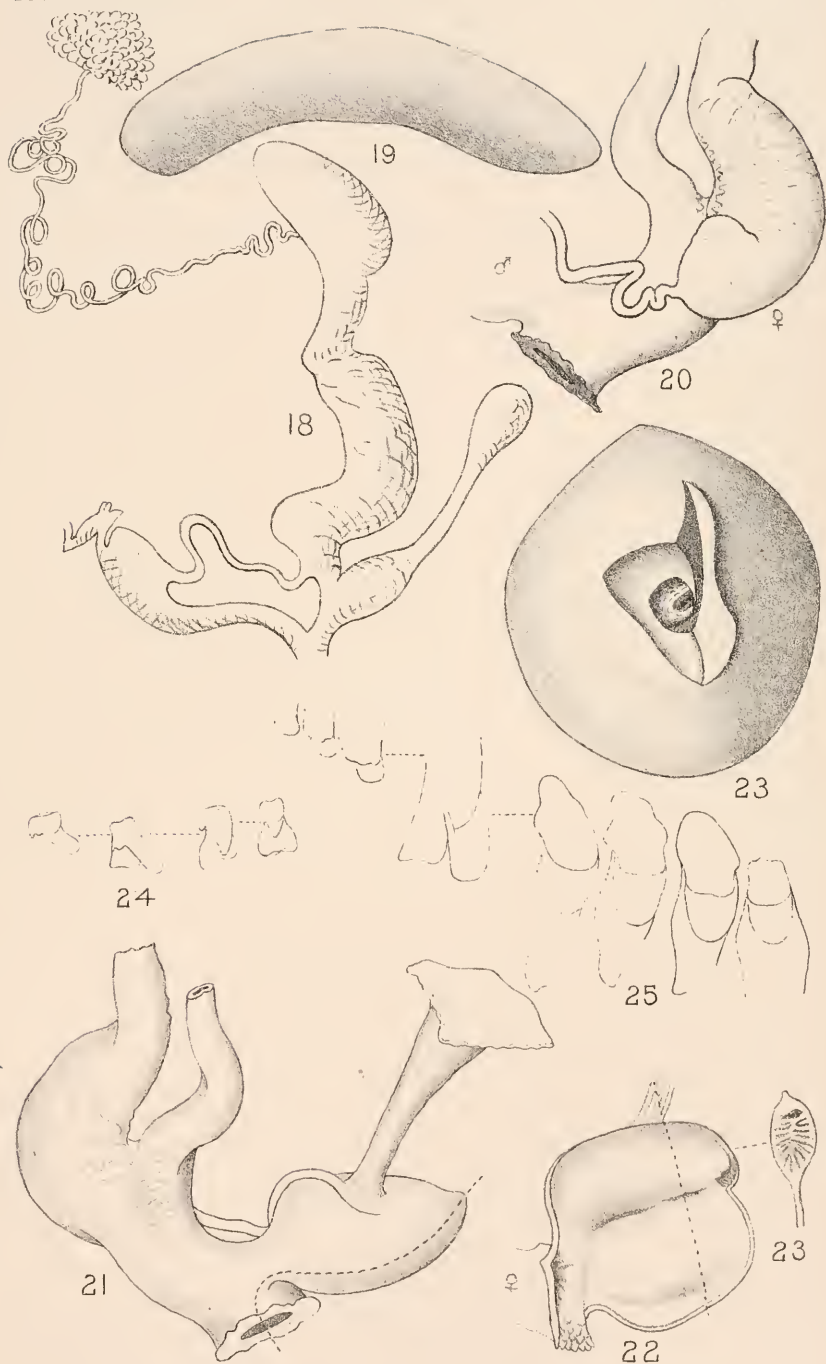


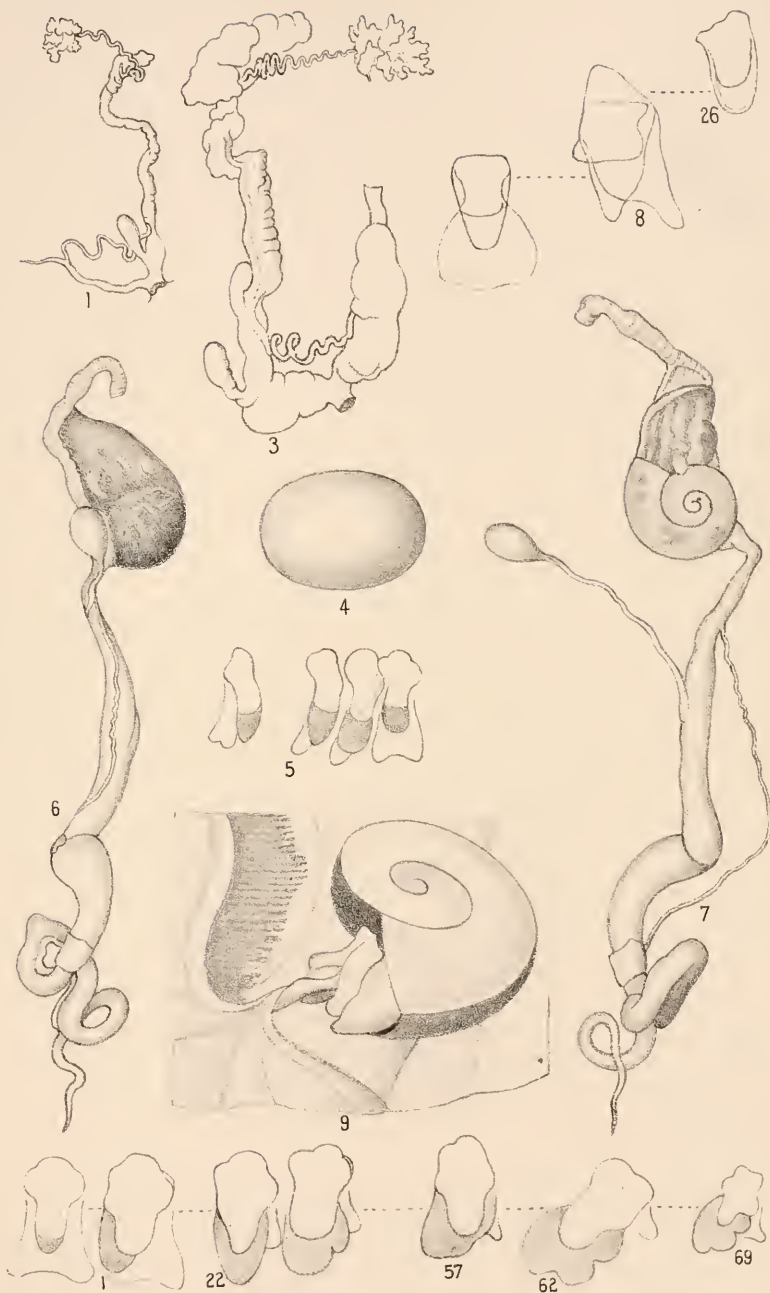


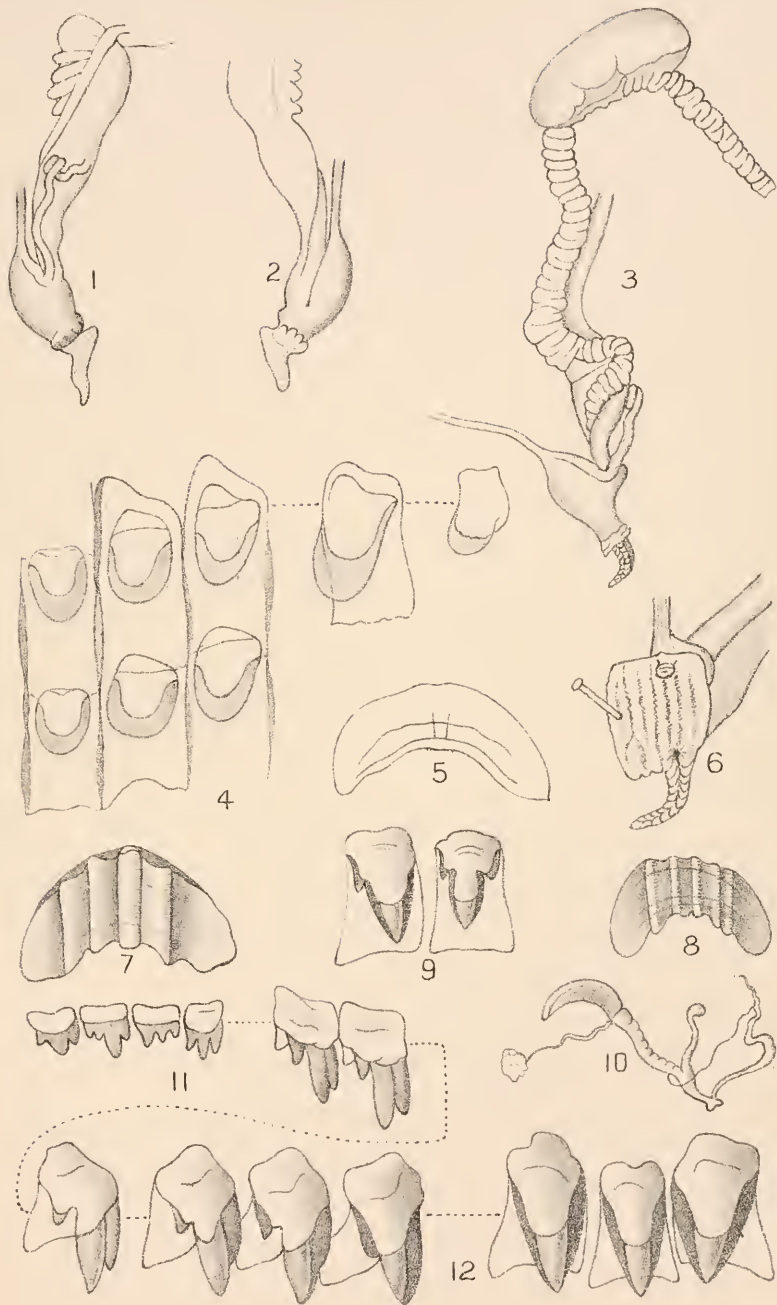


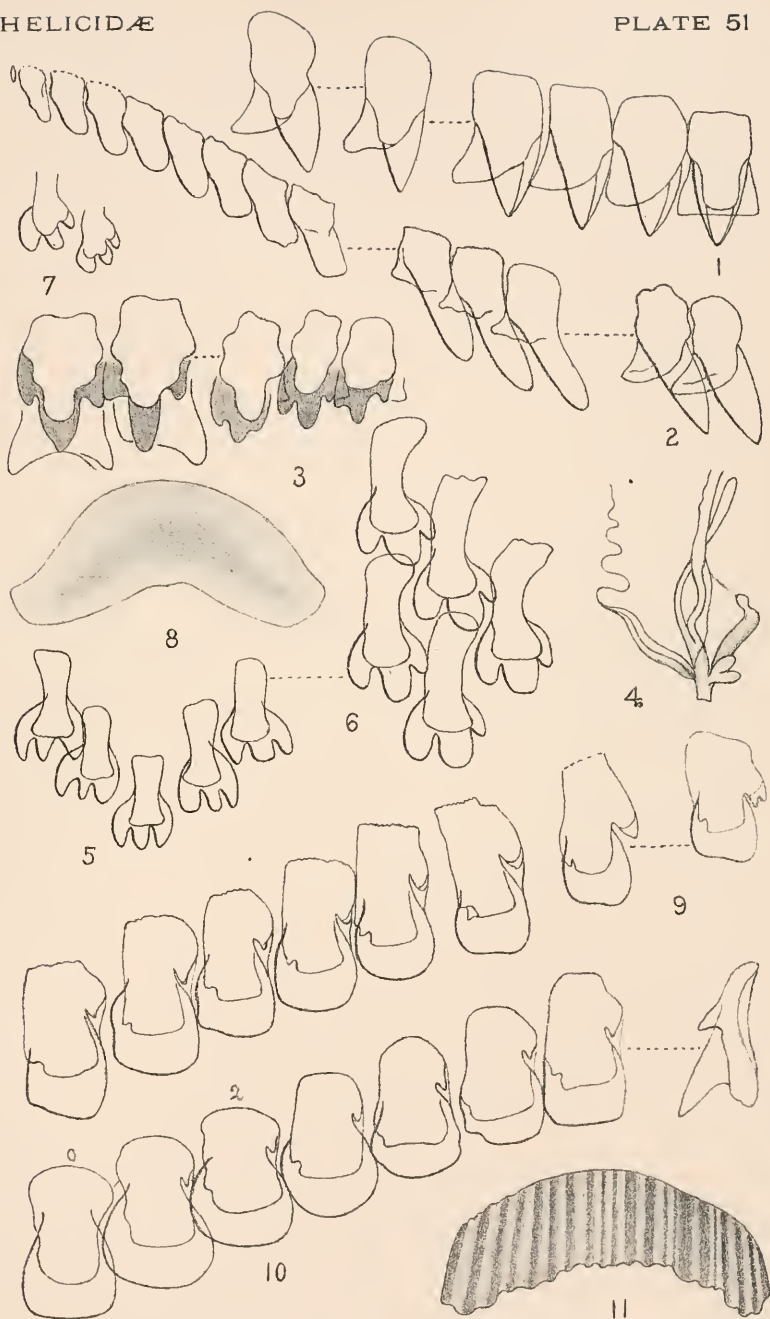


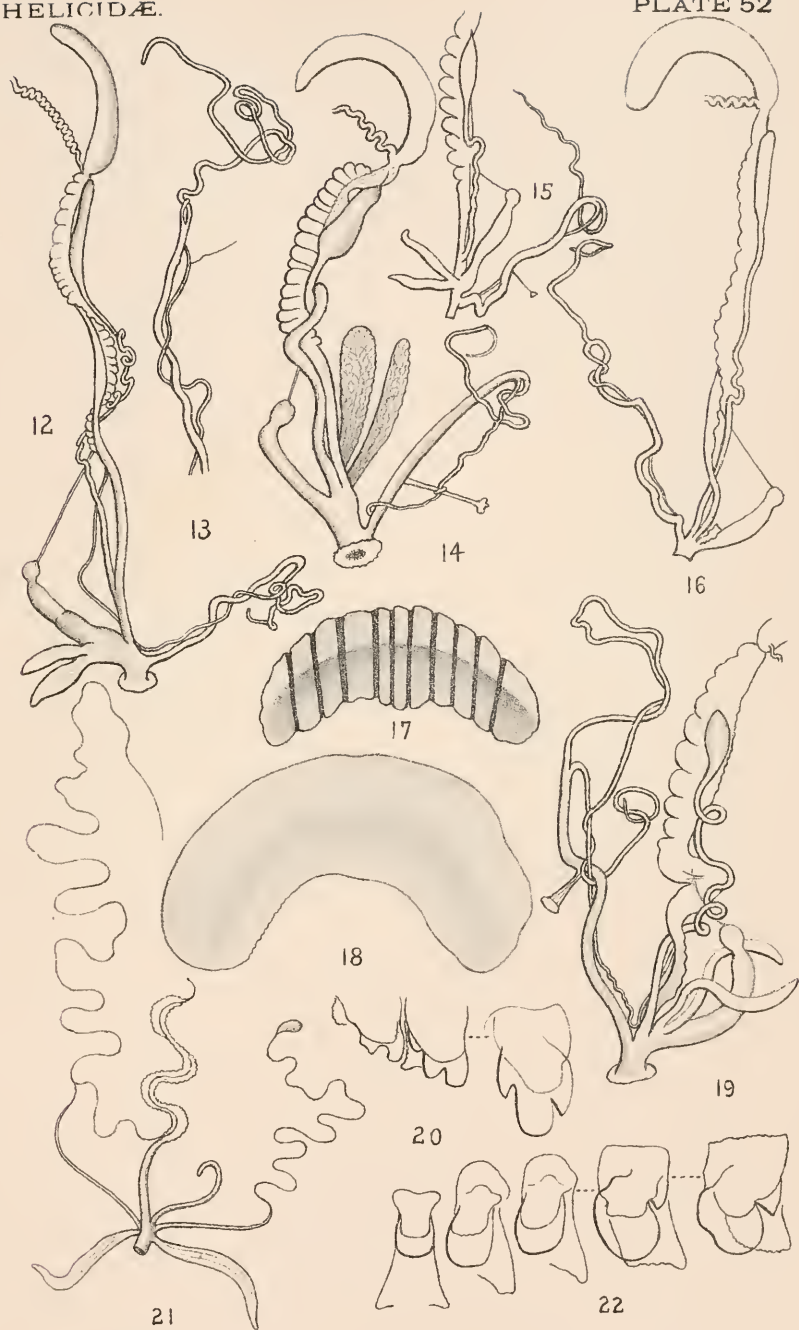


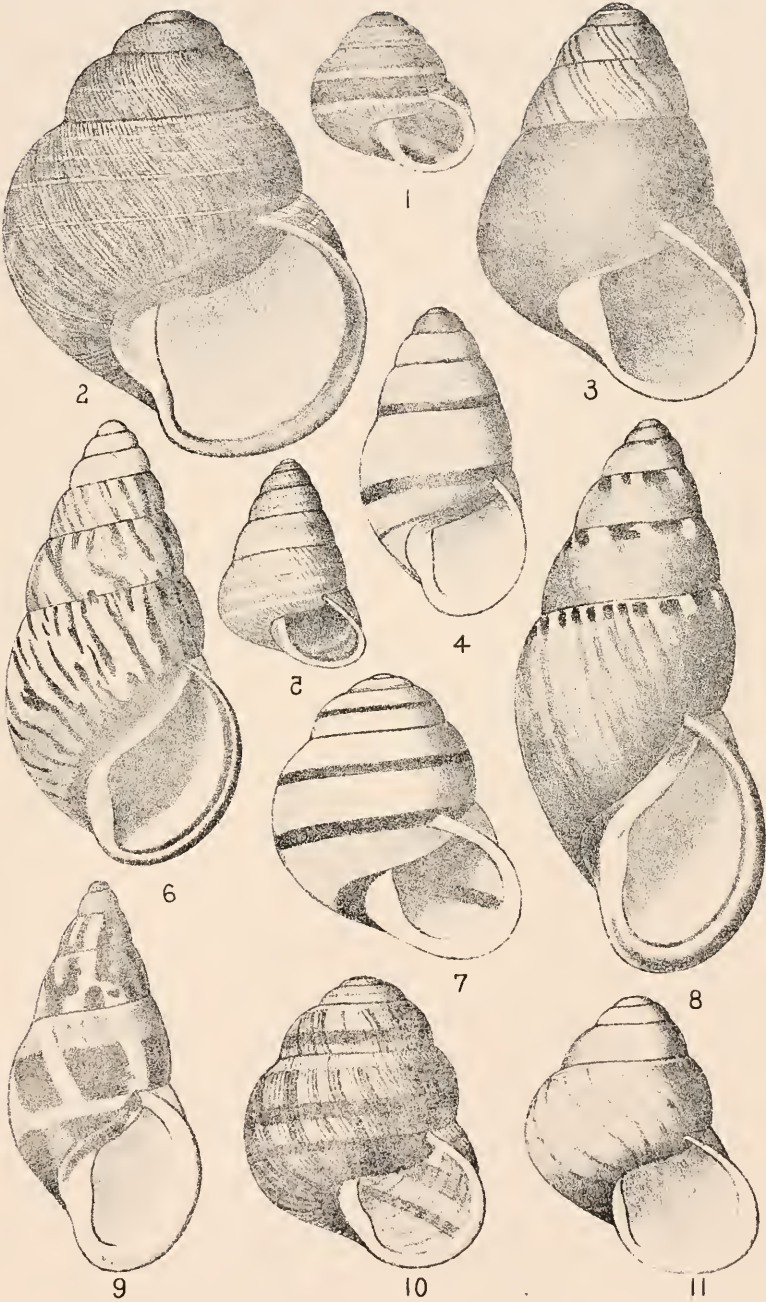






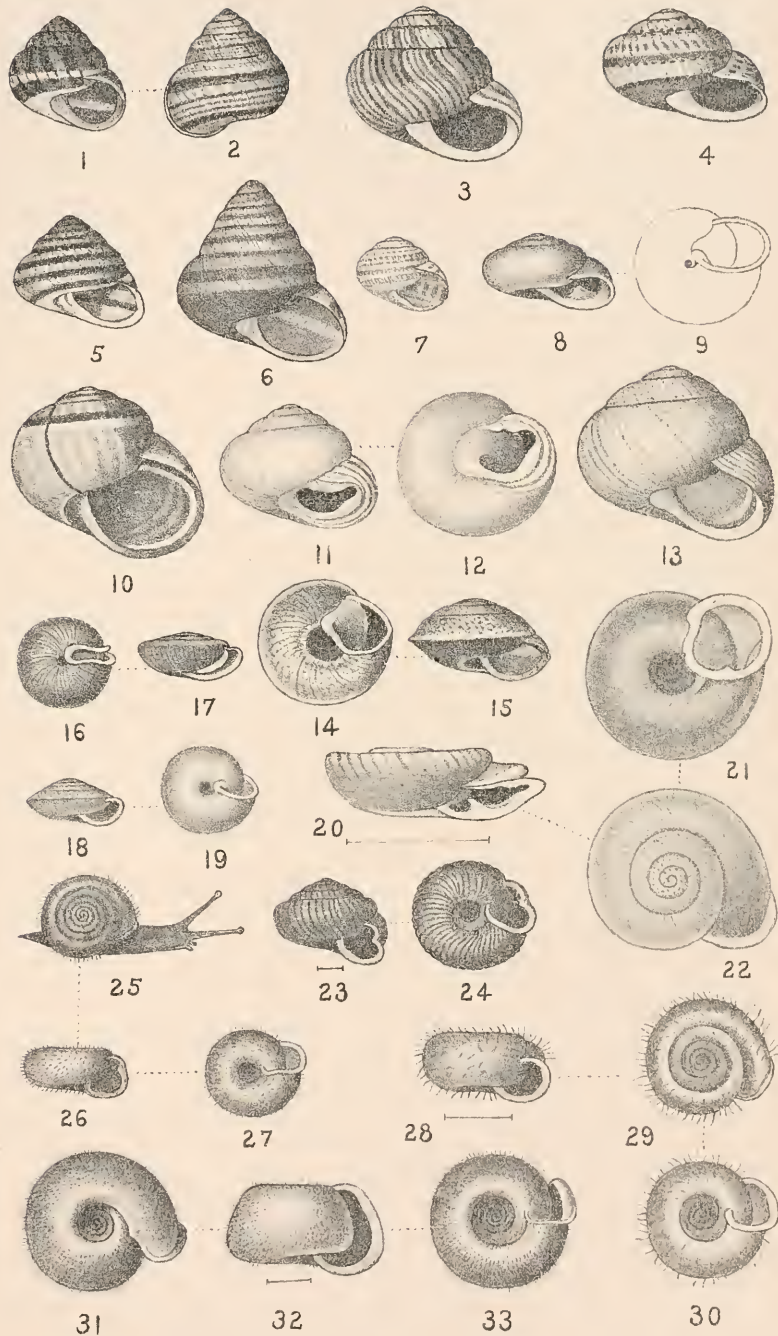


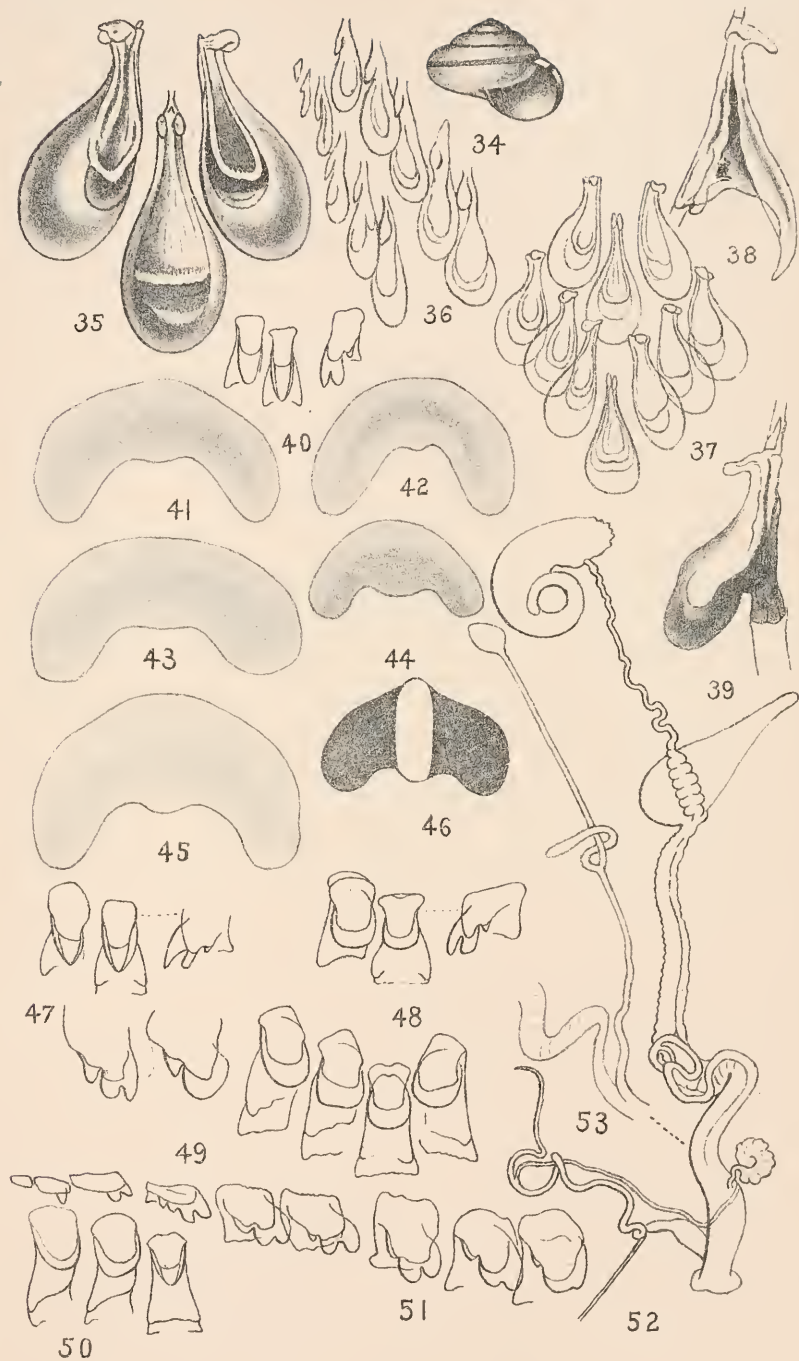














54



55



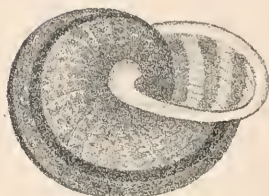
56



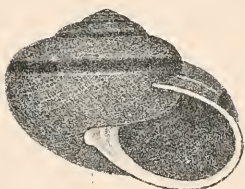
57



58



59



62



60



61



63



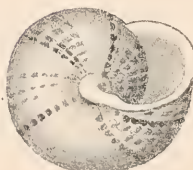
64



65



66



67



68



69



72



70



71



73



74



75



